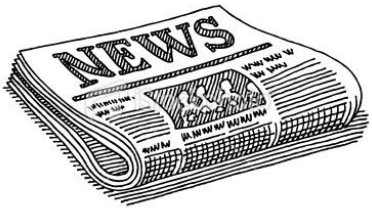


- Congressional Legislative Action:
  - May 2018:
    - On May 10, the U.S. House of Representatives passed H.R. 3053, "The Nuclear Waste Policy Amendments Act of 2018" (NWPAA) by a vote of 340-72. The bill assists in the resolution of the pending Yucca Mountain license, which will allow the formal licensing process to determine if the repository can be licensed and constructed. It also directs the U.S. Department of Energy (DOE) to move forward with a temporary storage program to consolidate spent nuclear fuel from sites with a decommissioned nuclear reactor while work on the Yucca Mountain repository progresses, including the authority to enter into a contract with a non-Federal entity. The bill also provides the state of Nevada and local stakeholders the opportunity to engage with the Federal government as the host State for the repository.
  - March 2018:
    - On March 7, the U.S. Senate approved S.97 "The Nuclear Energy Innovation Capabilities Act of 2017," which enables private companies to work directly with national laboratories to develop and demonstrate new reactor designs, as well as provide access to high-performance, computer-based modeling, and simulation techniques. Specifically, the bill authorizes development of a reactor-based source of fast neutrons, which are needed to test advanced reactors and related materials and fuels. The only commercially available fast neutron testing facility is currently located in Russia. The bill also aims to foster the sharing of technical information and expertise between DOE and the U.S. Nuclear Regulatory Commission (NRC), which may speed NRC licensing of advanced reactor designs. A similar version of the bill has already passed the U.S. House of Representatives.
    - On March 8, the U.S. Senate Committee on Energy and Natural Resources passed S.1457 "The Advanced Nuclear Energy Technologies Act," which directs the Secretary of Energy to enter into agreements with private companies to move ahead on at least four demonstration projects involving advanced nuclear reactors by the fall of 2028.

- May 30, 2018: Exelon's Oyster Creek Generating Station in New Jersey is beginning its first round of job cuts in preparation for its shutdown in October. On June 22, 84 jobs at the plant will be eliminated, according to a recent filing with the state.

- May 23, 2018: New Jersey Governor Phil Murphy signed multiple energy-related legislative initiatives on Wednesday, May 23th, designed to advance clean energy, including a bill to provide economic support to the state's nuclear power industry. The legislation allows the two-reactor, 2,486-MW Salem Plant, in which PSEG has a 57% ownership stake and Exelon Generation a 43% stake, and PSEG's fully owned 1,250-MW Hope Creek Plant, to receive zero-emission certificate payments.

- May 15, 2018: The Minnesota Senate passed a bill that would change the approval process for nuclear costs. Xcel Energy, Minnesota's largest utility company, is seeking approval for nuclear facility cost recovery before spending the money on facility repairs and maintenance. The two plants which host the three reactors need an estimated $1.42 billion to continue functioning through their respective license expirations in 2030, 2033, and 2034. The bill that passed the Minnesota Senate would give the Public Utilities Commission (PUC) power to reject or modify any Xcel nuclear proposal, and the PUC would

have sole discretion to approve any Xcel costs in excess of the company's original expected costs. Similar legislation is pending in the Minnesota House of Representatives.

- May 11, 2018: Construction of the mixed-oxide fuel fabrication facility (MOX) was formally ended by Secretary of Energy Rick Perry. The facility was designed to reprocess weapons-grade plutonium and uranium into fuel for reactors, but ballooning costs and missed construction milestones, along with the unraveling of a nuclear non-proliferation agreement between the U.S. and Russia, eventually caused the project to be discontinued. At the time of cancellation, the estimated cost of the project exceeded $18 billion with over $7 billion already spent. With the cancellation of the MOX plant, the National Nuclear Security Administration proposed installing pits to store plutonium waste at both the Savannah River Site and Los Alamos National Laboratory.

- May 9, 2018: Secretary of Energy Rick Perry stated the department is looking closely at using the Defense Production Act (DPA) to assist struggling coal and nuclear plants during a hearing with the U.S. House of Representatives committee on Science, Space, and Technology. The law allows the president to prioritize the federal government's ability to obtain critical, scarce industrial materials in a time of war, ensuring the government can buy the goods before others. A spokesperson said the agency has no timeframe to make a decision, but during the hearing Perry sought to reassure lawmakers that the agency would ultimately take some action to support coal and nuclear plants.

- May 1, 2018: The NuScale Power small modular reactor (SMR) design certification application has passed an intensive Phase 1 review by the NRC. There are another five phases in the design certification process, but NuScale says the first phase is the most rigorous and now expects the NRC to complete the certification process by September 2020. SMR technology holds the potential for lower capital costs because modular components and factory production can potentially reduce construction costs and time. Proponents also cite the simplicity of design of SMRs, their enhanced safety features, and their flexibility in terms of siting, sizing, and end-use applications.

- April 27, 2018: Secretary of Energy Rick Perry announced that the DOE has selected 13 projects to receive approximately $60 million in federal funding for cost-shared research and development for advanced nuclear technologies. These selections are the first under DOE's Office of Nuclear Energy's U.S. Industry Opportunities for Advanced Nuclear Technology Development funding opportunity announcement (FOA), and subsequent quarterly application review and selection processes will be conducted over the next five years. DOE intends to apply up to $40 million of additional FY 2018 funding for innovative proposals under this FOA. The FOA covers three funding pathways: first-of-a-kind nuclear demonstration readiness projects, advanced reactor development projects, and regulatory assistance grants.

- April 12, 2018: The Palo Verde nuclear plant could close early if Arizona passes the Clean Energy for a Healthy Arizona measure, which would amend the state constitution to require utilities to get half of their electricity from renewable sources by 2030. Arizona Public Service Co. (APS), which operates the plant, is opposed to the measure. APS officials claim the measure would prompt an overabundance of solar and wind power development that there would be too much energy on the grid during mild parts of the year when residents are not relying on air conditioning and forcing the shutdown of baseload plants. However, some analysts don't believe that closing the nuclear plant would be necessary because of the ballot measure. The Natural Resources Defense Council believes that there are fossil fuel resources APS could ramp down instead.

- April 5, 2018: The U.S. Nuclear Regulatory Commission (NRC) has approved the issuance of combined construction and operating licenses (COL) for the two proposed AP1000 reactors at Florida Power and Light (FPL)'s Turkey Point plant in Florida. The utility has yet to make a final decision on whether to proceed with building the reactors. In a June 2017 filing to the Florida Public Service Commission (PSC), FPL said that upon receipt of the COLs it "intends to pause the project to observe and understand the challenges faced by the first wave of AP1000 projects currently under way". This pause is estimated to be at least four years, the company said, which will push the commissioning and start-up dates for Turkey Point 6 and 7 from 2027 and 2028 to at least 2031 and 2032, respectively.

- March 7, 2018: Chinese Energy Administration reported China plans to start construction on six to eight nuclear reactors this year and complete construction of two long-delayed nuclear reactor projects, including the world's first Westinghouse AP1000 reactor, raising their total nuclear generating capacity by as much as six gigawatts. Currently, two AP1000 reactors are under construction at both the Sanmen site and at Haiyang in Shandong province. Sanmen 1 is expected to be the first Westinghouse AP1000 to begin operating. China aims to raise their total installed nuclear capacity to 58 gigawatts by the end of the decade. They plan to have another 30 gigawatts under construction by the end of 2020.

- March 6, 2018: The NRC chair laid out a six-step plan to reform the agency's regulatory approach for a new generation of advanced reactors that are now in early-stage development. NRC Chairwoman Kristine Svinicki told a Washington audience her agency will develop new phased processes to review non-light water nuclear plants and help industry develop new standards for the technologies. The NRC will also develop collaboration plans with vendors and assist with community outreach. The announcement comes as lawmakers and industry groups press the NRC to review and shorten its regulatory processes to help bring new reactor technologies to market.

- March 4, 2018, Edwin I Hatch nuclear plant's Unit 1 reactor began operating with Global Nuclear Fuels (GNF) test accident-tolerant fuel assemblies. This is the first of its kind to be installed in a commercial nuclear reactor. Southern shutdown the reactor in Georgia in February for a planned refueling and maintenance outage. In collaboration with GNF, lead test assemblies using an iron-chromium-aluminum fuel cladding material, known as IronClad, and coated zirconium fuel cladding, known as ARMOR, were installed. GNF said the IronClad material is designed to provide oxidation resistance and excellent material behavior over a range of conditions, with low oxidation rates at higher temperatures-further improving safety limit margin. Two variants of IronClad material were installed at Hatch 1- one in a fuel rod form but without fuel, and the other in the form of a solid bar segment.

- Pending License Renewal Applications
  - In 2018:
    - In late April, NRC accepted the Florida Power & Light (FP&L) application for a second license renewal of its Turkey Point 3 and 4 reactors, and is planning an 18-month review. This is the first ever application for a plant's second renewal period and, if granted, will allow the 2 reactors to operate to 2052 and 2053-a total of 80 years.
    - Exelon Corporation will file a second license renewal application in 2018 for its Peach Bottom Unit 2 and Unit 3 reactors, located in Delta, Pennsylvania. Peach Bottom Unit 2 reactor began commercial operation in July 1974, and its current license will expire in August 2033. Unit 3 reactor began commercial operation in December 1974, and its current license will expire in July 2034.

- By 2020:
  - Dominion will file will a second license renewal application for its Surry Power Station Unit 1 and 2 reactors in Surry, Virginia. Surry Power Station Unit 1 reactor began commercial operation in December 1972, and its current license will expire in May 2032. Unit 2 reactor began commercial operation in May 1973, and its current license will expire in January 2033.
  - Dominion will file a second license renewal for North Anna Unit 1 and 2 reactors near Mineral, Virginia. Unit 1 reactor's license was granted April 1978 and expires April 2038. Unit 2 reactor's license was granted August 1980 and expires August 2040.

★ FirstEnergy Nuclear Operating filed a certification letter with the NRC on April 26, giving notice of its decision to deactivate three nuclear plants over the next three years as it seeks to exit the competitive power generation business, which is struggling to compete with cheaper natural gas. The retirement schedule includes Ohio's Davis-Besse Nuclear Power Station (one reactor) by May 2020 and Perry Nuclear Power Station (one reactor) by May 2021, as well as Beaver Valley Nuclear Power Station (two reactors) by May and October 2021, respectively.

- The Ohio legislature is considering a bill, introduced in October, which values the zero-emissions plan by providing a subsidy similar to programs in New York and Illinois that is paid for by their customers.
- Several hearings were held on the proposed bill in the Ohio Senate, but it has yet to pass out of committee. A similar bill was considered in early 2017 but stalled. Governor Kasich indicated he does not support such legislation.
- On March 31, 2018, FirstEnergy Solutions filed for bankruptcy protection, days before a $100 million debt payment was due. The bankruptcy filing includes FirstEnergy Nuclear Operating Corporation but does not include FirstEnergy distribution, transmission, or regulated generation. FirstEnergy has stated that its power plants will remain operating during bankruptcy.
- FirstEnergy is also seeking relief from the U.S. Department of Energy under Section 202(c) of the Federal Power Act, stating that the company qualifies for help as their plants provide fuel security and diversity. FirstEnergy is requesting an emergency order to ensure "just and reasonable cost-based rates" for power generating stations which maintain 25 days of fuel onsite and are not recovering costs, citing the resiliency and reliability these plants provide. Secretary of Energy Rick Perry has not ruled out granting the request, but states there are many options to consider and the 202(c) request may not be the most appropriate.

★ The Westinghouse bankruptcy (March 2017) has resulted in the following recent actions:

- On April 6, 2018, Japan's Toshiba announced that it has completed the sale to Brookfield of its shareholding in Toshiba Nuclear Energy Holdings (US) Inc., the indirect holding company of Westinghouse Electric Company
- January 4, 2018, Brookfield Business Partners LP agreed to buy Westinghouse Electric Company from Toshiba (parent company of Westinghouse) including both its U.S. business out of bankruptcy and its non-bankrupt European business for $4.6 billion. Toshiba bought Westinghouse for $5.4 billion in 2006. The U.S. Bankruptcy Court must approve the sale.
- In January 2018, Dominion Energy proposed to buy SCANA Corporation and agreed to make up for customers being charged for the failed V.C. Summer nuclear construction project. In March, the Georgia Public Service Commission unanimously approved the merger, becoming the first state regulatory agency to act on the proposed combination that has already been approved by

the Federal Trade Commission. The acquisition now requires approval from two other state regulators in North and South Carolina where SCANA operates, in addition to the NRC, FERC, and SCANA's shareholders.

LICENSING ACTIONS

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 U.S. Nuclear Regulatory Commission (NRC), which will conduct an in-depth review of all safety and environmental aspects related to the design and / or site.

Reactor Design Certifications (DC)

By issuing a design certification, the NRC approves a nuclear power plant design, independent of an application to construct or operate a plant. A design certification is valid for 15 years from the date of issuance, but can be renewed for an additional 10 to 15 years. A Design Certification 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)*

Three reactor designs that are being considered for future builds in the United States are certified. Two additional designs, (including a small modular reactor design), are under NRC review. One is under renewal review and two have been withdrawn[1].

[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.

	VENDOR	TECHNOLOGY	STATUS
Issued	Westinghouse	AP1000	Issued: 12/30/2011
	General Electric-Hitachi	ESBWR	Issued: 11/14/2014
Renewal	General Electric-Hitachi	ABWR	Originally Issued 5/12/1997: DC Renewal Application is under review
Active DCAs	Korea Electric Power Corp	APR1400	Under Review: Final SER expected 9/2018
	NuScale Power	NuScale SMR Power Module	Under Review: Final SER expected 9/2020

Early Site Permits (ESP)

By issuing an ESP, the 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)*

Five ESPs have been issued. One is currently under review and one was withdrawn[2]

[2]Victoria County Station, Texas (Exelon) was withdrawn from NRC review 10/2012

	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
Active ESPs	Clinch River	TN	TVA	PPE	Under Review: Final Environmental Impact Statement expected 6/2019 Final SER expected 9/2019

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. *(From NRC website).* A COLA may reference a certified design and/or an early site permit, or neither.

Eighteen COLAs have been docketed by the NRC: Eight, totaling 14 reactors, have received COLs; one, totaling two nuclear reactors, remains under active NRC review; 10 were suspended and later withdrawn[3] due to utility, economic or other considerations while four remain in "suspended" status[4]. A Reference COL (R-COL) application has been submitted for five reactor designs (in addition to the designs for which a COL has been issued listed in the table below, COL applications were submitted for a USEPR and an US-APWR but were later withdrawn); subsequent COLs (S-COLs) incorporate the corresponding R-COL application by reference, noting any site-specific departures.

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

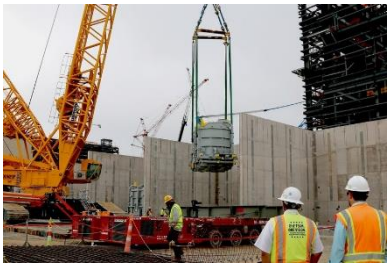
	SITE/LOCATION		UTILITY	REACTOR TECHNOLOGY/ NO. of REACTORS		STATUS
Issued	Vogtle	GA	Southern Nuclear	AP1000	2	Issued: 2/10/2012
	V.C. Summer	SC	SCE&G	AP1000	2	Issued: 3/30/2012
	Fermi	MI	DTE Energy	ESBWR	1	Issued: 5/1/2015
	South Texas Project	TX	STPNOC	ABWR	2	Issued: 2/12/2016
	Levy	FL	Duke Energy	AP1000	2	Issued: 10/26/2016
	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

A COL is valid indefinitely. If a licensee chooses not to construct a plant immediately following being granted 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.

NEW PLANT CONSTRUCTION

Until recently there were four Westinghouse AP1000 reactors under construction at the Vogtle (Georgia) and V.C. Summer (South Carolina) sites. Their construction has been impacted by the recent Westinghouse declaration of bankruptcy.

Vogtle



Vogtle 4 step-up transformer is lifted into place. (Courtesy of Georgia Power/ Southern Company, May 2018)

On May 10, 2018, Georgia Power announced that over the previous week workers placed the four main step-up transformers, each weighing 420,000 pounds, inside the Unit 4 reactor transformer bays located near the reactor's turbine building. The transformers will increase the voltage produced by the turbine generators from 26,000 volts to 500,000 volts before the energy flows to the state's power grid to serve hundreds of thousands of customers. Teams also completed a significant concrete placement inside the Unit 4 reactor containment vessel, clearing the path for installation of the first-floor module for the reactor.

On March 29, 2018, Georgia Power announced the emplacement of the reactor pressure vessel (RPV) in its permanent position in Vogtle Unit 4 reactor's containment building. Work will now begin to place piping, pumps and cabling throughout Vogtle Unit 4 reactor's containment building. Preparations will also begin for the installation of the first of the reactor's steam generators. The RPV was installed in Vogtle Unit 3 reactor in November 2016.

Two groups filed legal challenges to the Georgia Public Service Commission's (PSC) decision to allow Georgia Power and partners to complete two unfinished nuclear reactors at Plant Vogtle in early 2018. Southern Environmental Law Center, Partnership for Southern Equity, and Georgia Interfaith Power and Light filed a lawsuit in February arguing PSC violated state laws and the commission's own rules by approving spending that would nearly double the estimated cost of the project. Consumer group Georgia Watch filed a legal challenge in March alleging the PSC's decision benefits Georgia Power's shareholders over ratepayers. No hearing dates have been set for these filings.

In March, Georgia Power announced the latest construction milestone: a 13-plus hour continuous concrete placement for the Unit 4 reactor's "turbine tabletop." The turbine tabletop is 10 feet thick and comprised of approximately 2,400 cubic yards, or 250 individual concrete trucks, of self-consolidating concrete. The tabletop serves as a pedestal for the Unit 4 reactor's generator and turbines and is designed to support the weight of heavy components. With this milestone, more than 550,000 total cubic yards of concrete have been placed at the construction site to date.

VC Summer

In January 2018, Dominion Energy proposed to buy SCANA Corporation for $14.6 billion and agreed to make up for customers being charged for the failed V.C. Summer nuclear construction project with $1.3 billion in rebates and no rate increases for three years. In March, the Georgia Public Service Commission unanimously

approved the merger. The acquisition requires approval from North and South Carolina state regulators where SCANA operates, in addition to the Nuclear Regulatory Commission, the Federal Energy Regulatory Commission, and SCANA's shareholders. However, a separate bill passed in April by the South Carolina Senate may put the merger in jeopardy, as the state legislature approved a proposal to significantly cut the amount a private utility can charge customers to pay for the unfinished plant. Dominion originally said that this rate cut would likely end its offer to buy SCANA, but the company's management later said it might not walk away from SCANA if lawmakers force a temporarily electricity rate reduction to make up for the failed nuclear project.

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 reactors were being installed, while two of the four reactor coolant pumps for Unit 2 reactor are on site. Units 2 and 3 reactors 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, America is the world's largest producer of nuclear power, accounting for more than 30% of worldwide nuclear generation of electricity. Our 99 reactors produced approximately 805 billion kilowatt-hours (kWh) in 2017, 20% of America's total electrical output and nearly 60% 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 2017 of over 92% and all safety indicators exceeding targets.

In deregulated electricity markets, nuclear power plants are facing financial challenges from low cost electrical power sources.

This section covers information on operating plant uprates, supportive initiatives, and challenges impacting specific plants.

Operating Fleet: License Renewal and Uprate Status

License Renewal

Eighty-nine reactors have received 20-year extensions of their operating licenses from the U.S. Nuclear Regulatory Commission (NRC), including Kewaunee, Vermont Yankee and Fort Calhoun, which are now permanently closed. Applications for an additional four renewals (five reactors total) are currently under NRC review.

Applications for License Renewal

- Pending Applications:
  - Indian Point 2 & 3
  - Seabrook 1
  - Waterford 3
  - River Bend
- Anticipated Future Submittals:
  - Clinton Power Station 1
  - Comanche Peak Nuclear Power Plant 1 & 2

Applications for Second License Renewal

- In 2018:
  - In late January, Florida Power & Light (FP&L) filed an application for a second license renewal of its Turkey Point 3 and 4 reactors with NRC. This is the first application for a second renewal period to be filed and, if granted, will allow the reactors to operate to 2052 and 2053-a total of 80 years.
  - Exelon Corporation will file a second license renewal application in 2018 for its Peach Bottom Unit 2 and Unit 3 reactors, located in Delta, Pennsylvania. Peach Bottom Unit 2 reactor began commercial operation in July 1974, and its current license will expire in August 2033. Unit 3 reactor began commercial operation in December 1974, and its current license will expire in July 2034.

- By 2020:
  - Dominion will file will a second license renewal application for its Surry Power Station Unit 1 and 2 reactors in Surry, Virginia. Surry Power Station Unit 1 reactor began commercial operation in December 1972, and its current license will expire in May 2032. Unit 2 reactor began commercial operation in May 1973, and its current license will expire in January 2033.
  - Dominion will file a second license renewal for North Anna Unit 1 and 2 reactors near Mineral, Virginia. Unit 1 reactor's license was granted April 1978 and expires April 2038. Unit 2 reactor's license was granted August 1980 and expires August 2040.

Operating Fleet Uprate Activities

U.S. nuclear power plants have submitted power uprate applications to the NRC since the 1970s, accounting for an additional 7,902 MWe of output.

- Approved Applications
  - Hope Creek Unit 1 reactor – The NRC approved PSEG's 1.6% uprate request on April 24, 2018, increasing the reactor's output from approximately 3,840 to 3,902 megawatts thermal.
- Expected Applications, 2018 & beyond
  - As of May 31, 2018 the NRC reports there are zero pending or expected applications for power uprate.
  - FP&L said it plans to perform upgrades throughout 2018 to increase capacity by an estimated 40 megawatts.

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, state action in New York and Illinois to level the playing field and include nuclear energy in their clean energy policies has averted the closure of five power plants.

- Secretary of Energy Rick Perry told the U.S. House of Representatives committee on Science, Space, and Technology on May 9th that the department is looking at using the Defense Production Act to keep coal and nuclear plants from closing.
- Based on action initiated by the U.S. Department of Energy, the U.S. Federal Energy Regulatory Commission (FERC) is currently collecting resilience preparedness information from the regional transmission organizations/ independent system operators to ensure the resilience of the bulk power system.
- PJM Interconnection LLC, a regional transmission organization, is considering enhancements to energy price formation to allow all resources selected for dispatch to set price (i.e., baseload plants that are currently "price takers") which would more accurately reflect true costs to serve load.
- Two states (New York and Illinois) approved the creation of "zero emissions credit" to provide additional revenue to at-risk nuclear power plants;
- Ohio has considered similar legislation but progress appears to have stalled.
- The New Jersey Senate and Assembly passed bills, which Governor Phil Murphy signed into law on May 23rd, directing the state's Board of Public Utilities to issue zero emissions credits to eligible nuclear power plants. These credits are expected to apply to Hope Creek and Salem reactors but will not prevent the closure of Exelon's Oyster Creek reactor, which is scheduled to close in October 2018.
- Pennsylvania's state legislature created a nuclear caucus and there is growing interest in potential state action. Community and union leaders asked the caucus in April to award zero emissions tax credits to

Exelon-owned Three Mile Island and FirstEnergy's Beaver Valley. Three Mile Island is currently scheduled to close in 2019, and FirstEnergy recently announced plans to close Beaver Valley in 2021.

Five plants (7 reactors) announced they were closing prior to their license expiration date but were saved due to State Action:

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)	1065
2017-18	Nine Mile Point-1 & 2	NY	Exelon	2029 / 2046 (60)	1780
2018	Quad Cities 1 & 2	IL	Exelon	2032 (60)	1820
				Total Saved	**6,099**

Operating Fleet Status: Premature Closure

Some of the nuclear plants now closing are doing so because of state policy pressure (as with California's Diablo Canyon, 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, in a low electricity demand environment.

★ Five plants (6 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	566
2014	Vermont Yankee	VT	Entergy	2032	620
2016	Fort Calhoun	IN	Omaha Power	2033 (60)	479
				Total Closed since 2013:	**4675**

★ Nine plants (12 reactors) have announced plans to retire prior to their license expiration date:

PENDING CLOSURE YEAR	SITE / LOCATION		UTILITY	LICENSE EXPIRATION (TERM)	POWER (MWe)
2018	Oyster Creek	NJ	Exelon	2029 (60)	610
2019	Pilgrim 1	MA	Entergy	2032 (60)	678
	Three Mile Island 1	PA	Exelon	2034 (60)	803
2020	Davis-Besse	OH	FirstEnergy	2037 (60)	894
2021	Perry	OH	FirstEnergy	2026 (40)	1256
	Beavery Valley 1 & 2	PA	FirstEnergy	2036 / 2047 (60)	1,826
2020-21	Indian Point 2 & 3	NY	Entergy	2013 / 2015 (40) * renewal application under review	2060
2022	Palisades	MI	Entergy	2031 (60)	789
2024-25	Diablo Canyon 1 & 2	CA	PG&E	2024 / 2025 (40)	2240
				Total Pending Closures:	**11,156**