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Energy and Telecommunications Interim Committee
Trevor Graff

FINAL REPORT TO THE 68TH MONTANA LEGISLATURE

ADVANCED REACTORS: SJ3 STUDY OF NUCLEAR POWER GENERATION

LEGISLATIVE SERVICES DIVISION

P.O. Box 201706
Helena, MT 59620-1706
Phone: (406) 444-3064
Fax: (406) 444-3971

WEBSITE: HTTP://LEG.MT.GOV/XXX

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This report is a summary of the work of the Energy and Telecommunications Interim Committee, study of Senate Joint Resolution 3 (2021).

This report highlights key information from the study. Additional information, including audio minutes, exhibits, and a digital version of this report with links is available at the ETIC website: https://leg.mt.gov/committees/interim/etic/

Introduction and Committee Recommendation

With the passage of Senate Joint Resolution 3 (SJ 3), the 2021 Montana Legislature directed the Energy and Telecommunications Interim Committee to conduct extensive research on the potential to develop advanced nuclear reactor for the purpose of generating electricity in the state.

SJ 3 directed the committee to study the following:

1. current Montana regulations that need revision in order to enable the construction and operation of advanced nuclear reactors;
2. the economic feasibility of replacing coal-fired boilers with advanced nuclear reactor while; and
3. evaluate the safety of, and the waste stream resulting from, the construction and operation of advanced nuclear reactors and gather input from residents of the Colstrip area.

Committee members conducted extensive panel discussions and participated in a field trip to the U.S. Department of Energy's National Labs to gather more information regarding the efficacy of the technology, waste management practices, reactor economics and potential revisions to state regulation of nuclear power.

ETIC members acknowledged the potential upside of developing a net-zero carbon emitting, baseload generation source in the state, while recognizing the potential for high start-up costs and long-term impacts of nuclear waste. The committee did not put forth a committee bill, but compiled the following report to provide legislators a broad overview of advanced nuclear reactor technology for future discussions.

Advanced Nuclear Reactors 101

Historically the nuclear power generation sector in the United States relies on large light water reactors (LWRs) first constructed in the 1950s and early 1960s. The large, on average, 1,000 megawatt plants are cooled by water, moderating the nuclear fission reaction that creates the heat needed for electric generation. In recent years the sector, facing the high construction costs of large LWRs, and safety concerns have turned to "advanced" nuclear technologies that could prove less expensive and safer than conventional reactors while maintaining a viable, noncarbon emitting baseload generation source for the future.

> Congress defined "advanced nuclear reactors" as “a nuclear fission reactor with significant improvements over the most recent generation of nuclear fission reactors” or a reactor using nuclear fusion.

The federal Nuclear Energy Innovation Capabilities Act of 2017 defined "advanced nuclear reactors" as “a nuclear fission reactor with significant improvements over the most recent generation of nuclear fission reactors" or a reactor using nuclear fusion.[1]

Advanced reactors are often referred to as "Generation IV" nuclear technologies, with existing commercial reactors referred to as "Generation III." Advanced reactors include advanced water-cooled reactors, gas-cooled reactors, liquid metal-cooled reactors, and fusion reactors, which would release energy through the combination of light atomic nuclei rather than the splitting (fission) of heavy nuclei such as uranium. Most of these concepts have been studied, but few, have advanced to commercial scale demonstration.

As the Energy and Telecommunications Interim Committee begins its study of advanced nuclear power's feasibility in Montana, this report aims to provide an overview of existing advanced technologies and a brief overview of the issues surrounding advanced nuclear power.

Advanced Reactor Design

Advanced reactor designs use new and existing technologies and materials to attempt to improve nuclear reactors in one or more of the following areas: cost, safety, security, waste management, and versatility. To achieve these improvements, advanced designs may incorporate inherent or passive safety features, simplified or modular designs, enhanced load-following capabilities, high chemical and physical stability, fast neutron spectrums, and "closed" fuel cycles.

Typically, advanced reactors are grouped into three major technology types:

- Advanced water-cooled reactors, which provide improvements to proven water-based fission technologies through innovations such as simplified design, smaller size, or enhanced efficiency;
- Non-water-cooled reactors, which are fission reactors that use materials such as liquid metals (e.g., sodium and lead), gases (e.g., helium and carbon dioxide), or molten salts as coolants instead of water; and
- Fusion reactors, which seek to generate energy by joining small atomic nuclei, as opposed to fission reactors, which generate energy by splitting large atomic nuclei.

Small modular reactor technology can be found in each of the three categories. The U.S. Department of Energy defines SMRs as a reactor with a generating capacity no more than 300 megawatts, which employ modular construction techniques, "employ modular construction techniques, ship major components from factory fabrication locations to the plant site by rail or truck, and include designs that simplify plant site activities required for plant assembly."[2] Both advanced water-cooled reactors and non-water-cooled reactors may be configured as SMRs.

[1] P.L. 115-248
[2] U.S. Department of Energy, "Advanced Small Modular Reactors (SMRs)"

Most proposed advanced reactors would be considered “small modular reactors” (SMRs), which DOE defines as having generating capacity of 300 MW or below. Supporters of SMRs contend that they would be small enough to be assembled in factories and shipped to reactor sites to reduce construction costs. In addition, SMRs could reduce the financial risks of building a new nuclear power plant, because each module would cost less than today’s large reactors and revenues could begin when the first module was complete. However, some analysts contend that SMRs would be too small to achieve the economies of scale needed for economic viability.

Light water-cooled SMRs, high-temperature gas-cooled reactors, and sodium-cooled fast reactors are considered to be among the most mature of the unconventional reactor technologies. Molten salt reactors, gas-cooled fast reactors, and fusion reactors are generally considered to be further from commercialization.

Estimates of operational timeframes of these technologies range widely, from the mid-2020s for the first small modular LWRs to midcentury or later for some advanced reactor concepts, such as molten salt reactors and gas-cooled fast reactors. [3]

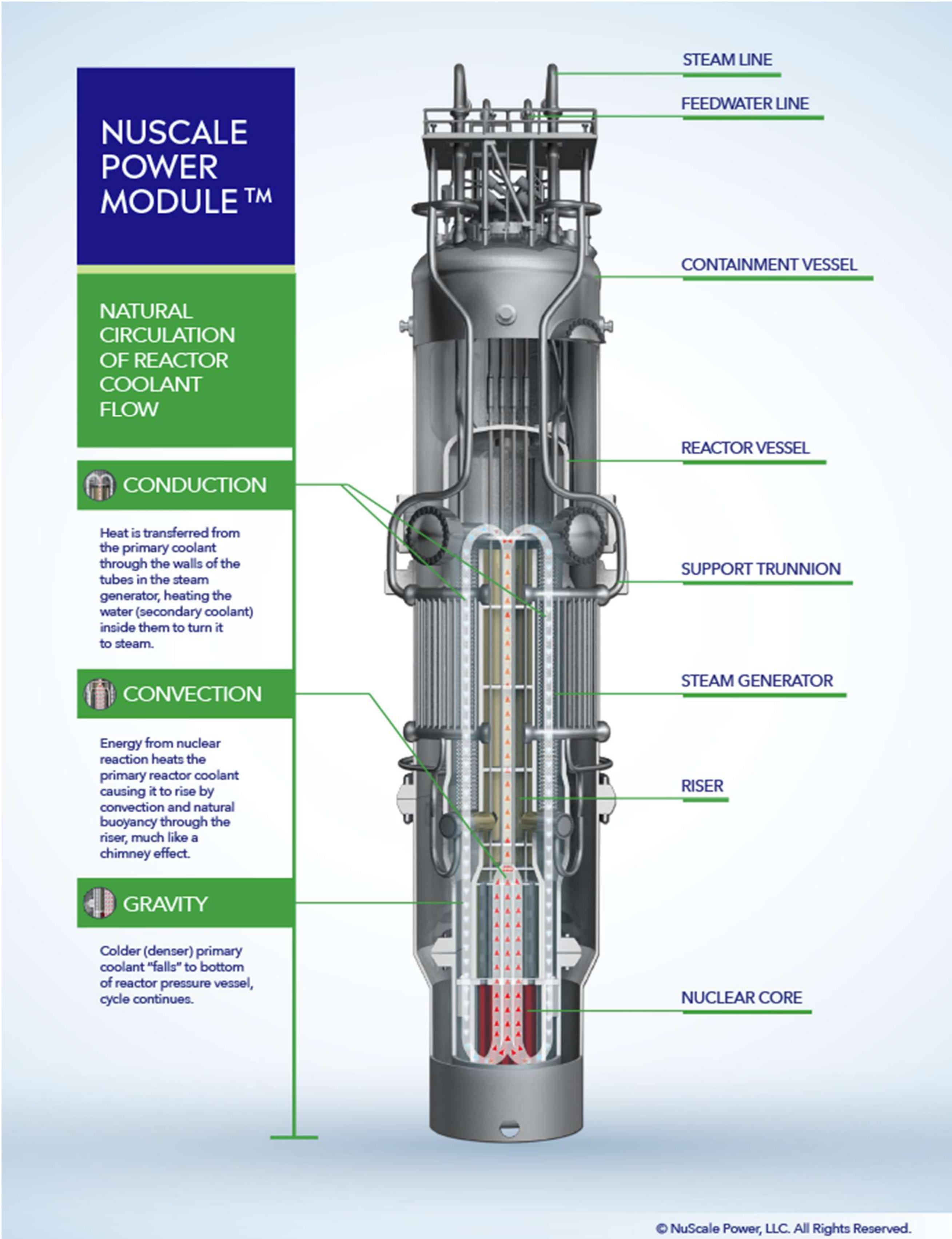
Advanced Water-Cooled Reactors

Light-Water Small Modular Reactors

Light water reactor SMR designs are based on existing commercial LWR technology but are small enough to allow all major reactor components to be placed in a single pressure vessel. The reactor vessel and its components are designed to be assembled in a factory and transported to the plant site for installation, potentially reducing construction time and costs from those of large LWRs. If large numbers of SMRs were ordered, mass production could further reduce manufacturing costs and construction schedules, according to proponents of the technology.

SMRs require a fraction of the capital investment of a large conventional nuclear unit, reducing the financial risk to plant owners. However, some observers have suggested that the smaller size of SMRs would reduce the economies of scale available to larger reactors, potentially negating any SMR cost advantages.[4]

[3] Massachusetts Institute of Technology, “The Future of Nuclear Energy in a Carbon-Constrained World.”
[4] Lyman, Edwin, "Small Isn't Always Beautiful: Safety, Security, and Cost Concerns about Small Modular Reactors," Union of Concerned Scientists, September 2013


NUSCALE POWER MODULE ™
NATURAL CIRCULATION OF REACTOR COOLANT FLOW
CONDUCTION
Heat is transferred from the primary coolant through the walls of the tubes in the steam generator, heating the water (secondary coolant) inside them to turn it to steam.
CONVECTION
Energy from nuclear reaction heats the primary reactor coolant causing it to rise by convection and natural buoyancy through the riser, much like a chimney effect.
GRAVITY
Colder (denser) primary coolant "falls" to bottom of reactor pressure vessel, cycle continues.
STEAM LINE
FEEDWATER LINE
CONTAINMENT VESSEL
REACTOR VESSEL
SUPPORT TRUNNION
STEAM GENERATOR
RISER
NUCLEAR CORE
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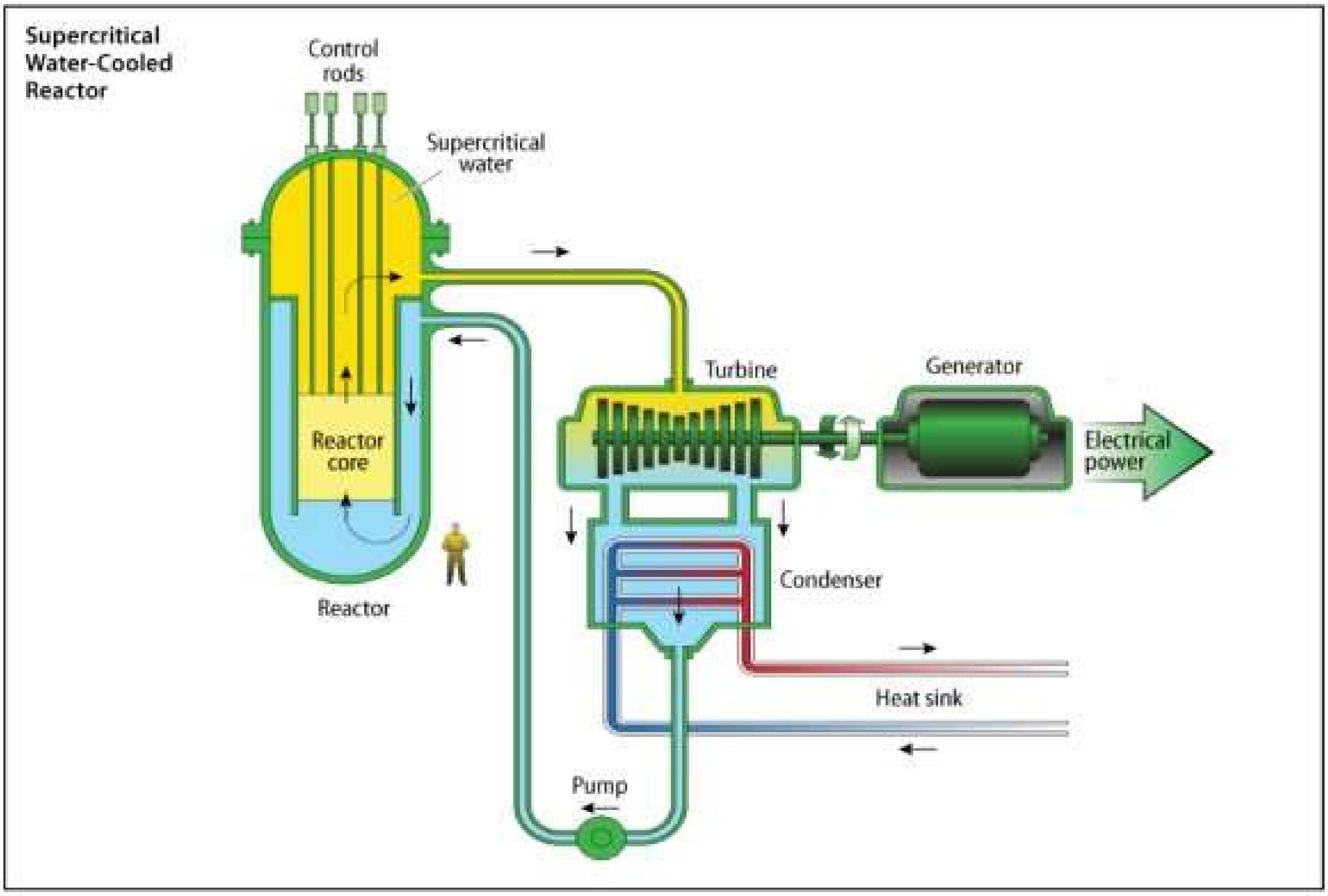
A 60 MW reactor module by U.S. company NuScale Power is considered the most mature light water SMR design under development. The design would allow between 6 and 12 SMR modules—depending on the energy needs of the site—to be co-located in a central pool of water, which serves as a heat sink and passive cooling system. NuScale is planning to begin operating its first 12-module plant in the mid-2020s. It is to be built at Idaho National Laboratory with a combination of federal government and non-federal support. The major components of the NuScale plant are designed to be factory fabricated and shipped to the plant site for installation.[5]

In addition to NuScale, examples of U.S.-based companies developing this technology include Holtec, Westinghouse, and GE Hitachi.

[5] NuScale Power

Supercritical Water-Cooled Reactors

The supercritical water-cooled reactor (SCWR) is a high-temperature version of LWR technology. SCWRs use water heated to a temperature and pressure leaving liquid and vapor states indistinguishable efficiency. As in a conventional boiling water reactor (BWR), liquid water passes through the reactor core and turns directly to steam, driving a turbine-generator. The superheated conditions would eliminate the need in current BWRs for reactor coolant pumps and steam separators and dryers.[6]



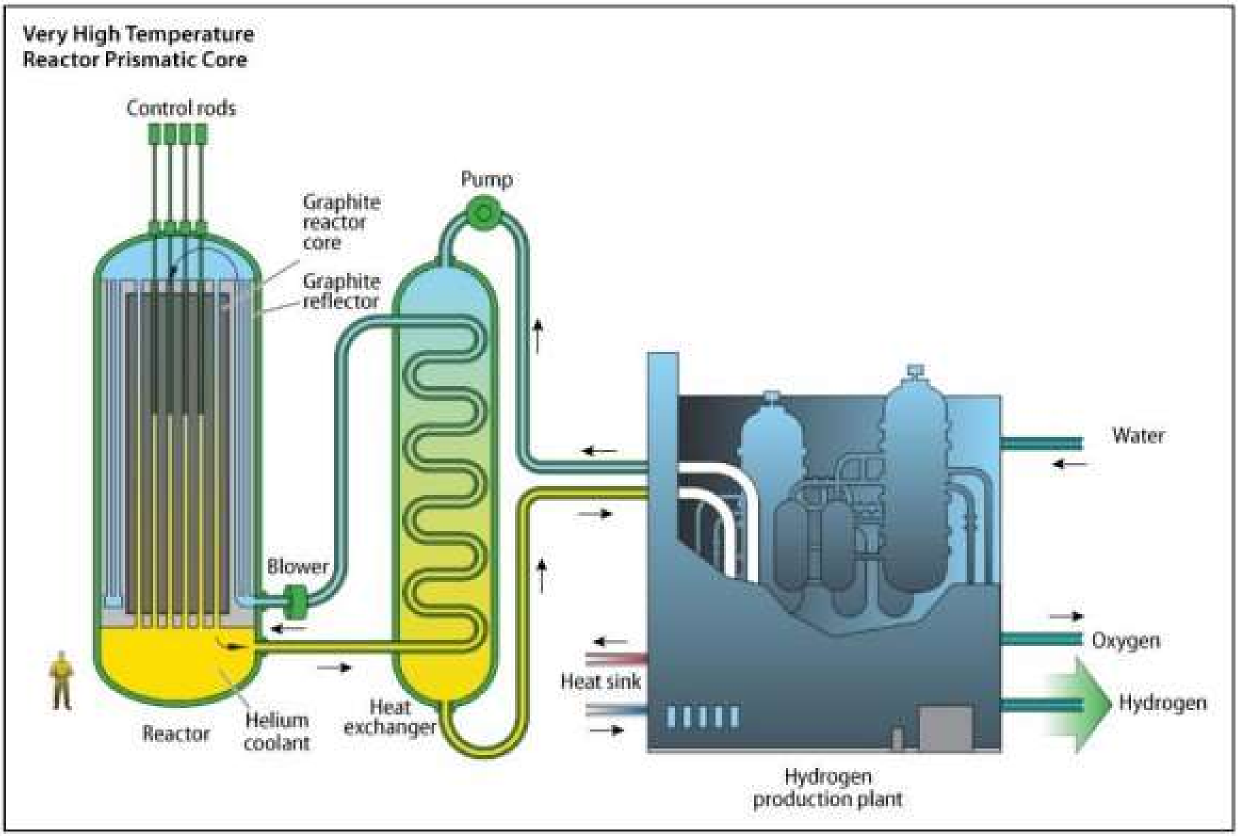
Supercritical water is already used to boost plant efficiency in some advanced coal- and gas-fired power plants. Organizations in Canada, China, the European Union, Japan, and Russia are developing SCWRs.

[6] Gen IV International Forum, "Supercritical-Water-Cooled Reactor (SCWR)," September 24, 2018

Non-water Cooled Reactors

High-Temperature Gas Reactors

High temperature gas reactors (HTGRs), including very high temperature gas reactors (VHTRs), are helium-cooled, graphite-moderated thermal reactors. They operate at higher coolant outlet temperatures than most existing reactors. This higher temperature allows for the provision of heat for industrial processes, such as the cogeneration of electricity and hydrogen, and hightemperature processes in the iron, oil, and chemical industries.[7]



[7] Gen IV International Forum, "Very-High-Temperature Reactor (VHTR)," September 21, 2018

There are two primary design variants: In one, the core is composed of graphite blocks with removable sections that have been embedded with fuel particles; in the other, many billiard ball sized graphite spheres, or "pebbles," with embedded fuel particles are loaded into the core to form a "pebble bed." The spheres are steadily removed from the bottom of the reactor, tested for their level of burnup, and returned to the top of the reactor if they are still viable as fuel and replaced if not. Many HTGRs have been designed as SMRs.

A unique feature of these reactors is their fuel, which is composed of poppy seed-sized fuel particles that have been encased in silicon carbide and other highly heat-resistant coatings. Coupled with the high heat capacity of the graphite moderator, the reactor and its fuel are designed to withstand the maximum core heat attainable during an accident. Therefore, according to HTGR proponents, even the loss of active cooling systems would not result in a core meltdown and radioactive releases to the environment.

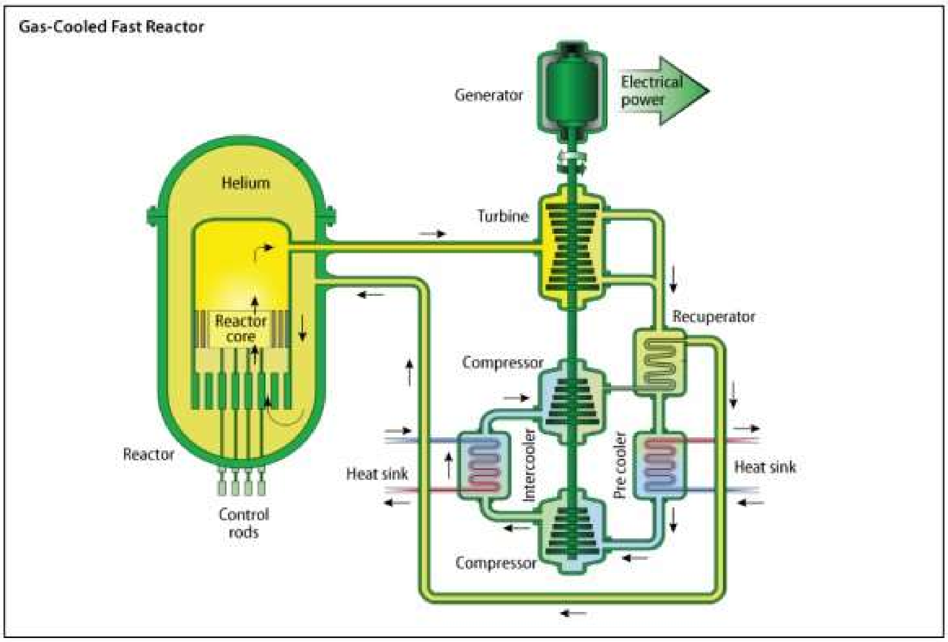
HTGRs are among the most technologically mature of the advanced reactor concepts. Since the 1960s a number of experimental and commercial HTGRs have been built in multiple countries, including the United States, United Kingdom, Japan, Germany, and China. A small, two-unit pebble bed HTGR plant is currently under construction in China.

Development of HTGRs was promoted in the United States by the Next Generation Nuclear Plant (NGNP) program, established by the Energy Policy Act of 2005.[8] In 2016, DOE awarded X-energy $53 million over five years to develop a modular pebble bed HTGR design. Xenergy received a second DOE contract for $10 million in 2018. X-energy is also working with DOE and others to develop the fuel technology that would be used in an HTGR pebble bed reactor. Other U.S. companies developing HTGRs include HolosGen32 and Hybrid Power Technologies.

[8] P.L. 109-58

Gas-cooled Fast Reactor

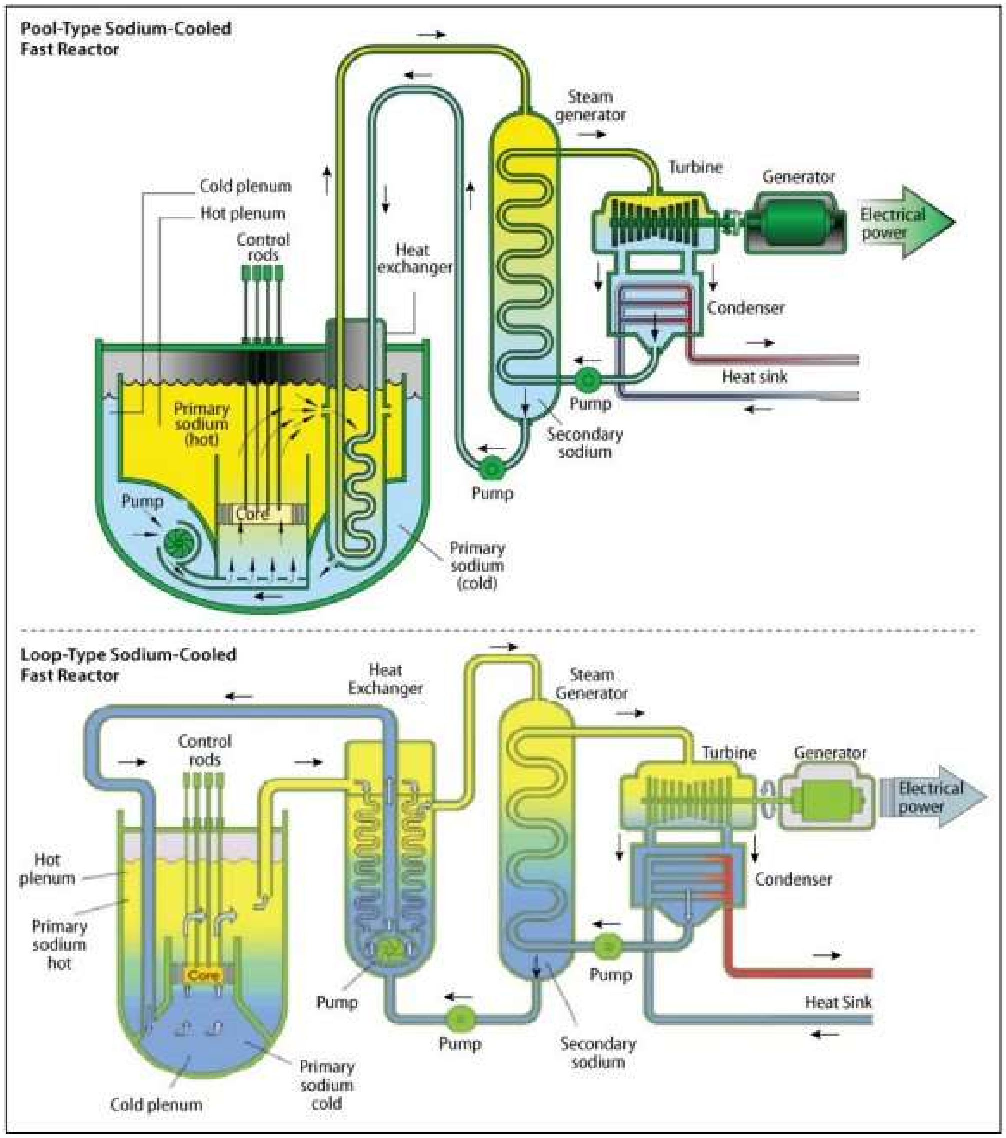
Gas-cooled fast reactors (GFRs) are high-temperature, closed fuel cycle fast reactors using helium as a primary coolant (Figure 3). The primary difference between the HTGR and the GFR is the neutron spectrum: HTGRs operate in the thermal spectrum, while GFRs operate in the fast spectrum. Therefore, the GFRs would not require the massive graphite moderator of HTGRs to slow the neutrons. The GFR would use a closed U-Pu fuel cycle in which the plutonium and uranium would be recycled from the spent fuel to provide a greatly expanded fuel source. GFRs have operating temperatures similar to those of HTGRs making them suitable for providing process heat for industrial purposes, in addition to producing electric power. One disadvantage of this design is the lower heat removal capability of the helium gas coolant compared to liquid metal coolants such as sodium and lead in the event of an accident.



In 2015, a consortium of European countries, including the Czech Republic, Hungary, Poland, and Slovakia, launched a project to jointly develop a demonstration GFR based on a French design. The group set a goal of completing the conceptual design for the ALLEGRO reactor by 2025, with construction to begin thereafter. If successful, ALLEGRO would be the first demonstration of a GFR to date. General Atomics is an example of a U.S. company developing a GFR design, the Energy Multiplier Module (EM2).

Sodium-Cooled Fast Reactors

Sodium-cooled fast reactors (SFRs) are among the most mature of the unconventional nuclear concepts. SFRs use fast reactor technology with liquid sodium as the primary coolant. The use of a liquid metal as the coolant allows the primary coolant circuit to operate under lower, near-atmospheric pressure conditions. In addition, even in an emergency without backup electricity, the high heat-transfer properties of liquid sodium (100 times greater than water) would allow for passive cooling through natural circulation.[9]



SFRs come in two main design variants: loop-type and pool-type designs. In the pool-type SFR, the reactor core and primary heat exchanger are immersed in a single pool of liquid metal, while the loop-type houses the primary heat exchanger in a separate vessel. SFR technologies are conducive to modularization.

[9] U.S. Department of Energy, Office of Nuclear Energy, "Sodium-cooled Fast Reactor (SFR) Technology and Safety Overview," February 18, 2015

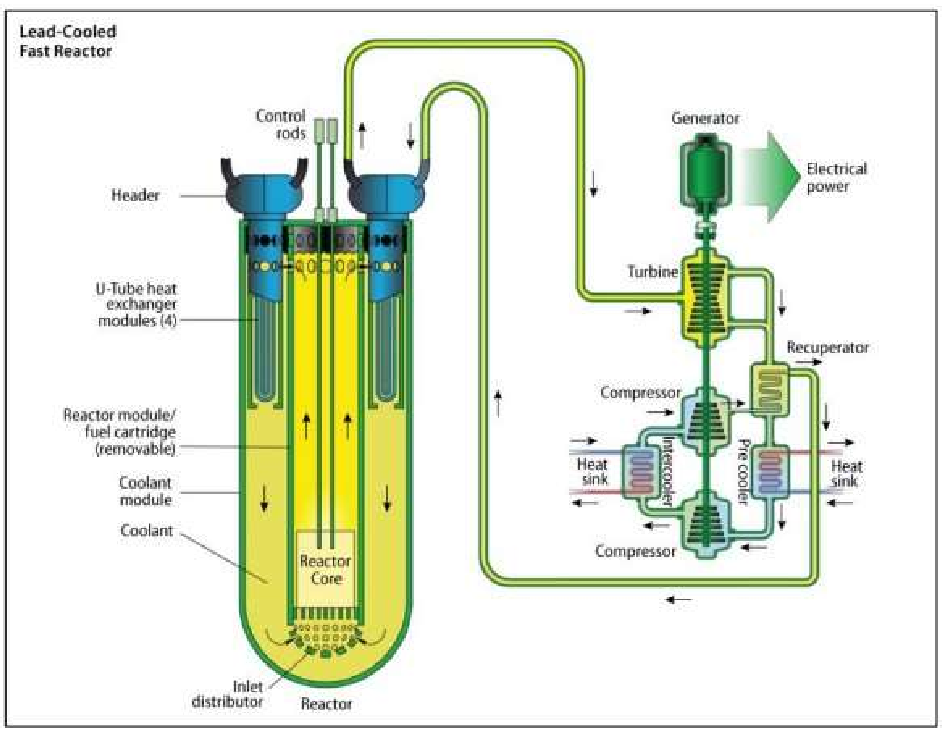
A disadvantage that has been raised about using sodium as a coolant is that it reacts violently with both air and water. As a result, the primary sodium coolant system (which contains highly radioactive sodium) is often isolated from the steam generation system by an intermediary coolant to prevent a release of radioactivity in the case of an accident. This adds costs and complexity to the system, complicates maintenance and refueling, and introduces an additional safety concern. Fires resulting from sodium leaks have caused shutdowns in several SFRs that have been built to date.

Most SFR designs would use a closed fuel cycle in which plutonium and uranium would be reused from the spent fuel to provide an indefinite fuel source when configured as a breeder; the process would be similar to that used for the GFR (above). Other designs would rely on future advances in fuel technology to extend the fuel cycle to the point where refueling would only need to occur once in a number of decades. SFRs can achieve high burnup of actinides in spent fuel, potentially reducing the long-term radioactivity of high-level nuclear waste.

The first SFR was built in the United States in 1951. The United States maintained SFRs as a high priority focus of its nuclear R&D program (primarily due to the technology's plutonium breeding capabilities) up until the cancellation of the Clinch River Breeder Reactor demonstration plant in 1983 amid public opposition, rising construction costs, and increased concern over weapons proliferation.

Examples of U.S. companies developing SFRs include Advanced Reactor Concepts, Columbia Basin Consulting Group, General Electric-Hitachi, Oklo, and TerraPower.

Lead-Cooled Fast Reactors



Lead-cooled fast reactors (LFRs) are designed to use a closed fuel cycle with either molten lead or lead-bismuth eutectic (LBE) alloy as a primary reactor coolant (see Figure 5). The use of lead as a coolant is seen to confer several advantages. As with the SFR, the use of a liquid metal coolant allows for low-pressure operation and passive cooling in an accident. In contrast to liquid sodium, however, molten lead is relatively inert, adding additional safety and economic advantages. Lead also has a high rate of retention of radioactive fission products, which offers benefits in an accident that could release radioactive materials. In such an accident, the chemical properties of the lead could prevent many of the harmful radionuclides from escaping into the atmosphere.

At high temperatures, lead tends to corrode structural steel. Lead is also highly opaque, presenting visibility and monitoring challenges within the core, and very heavy, due to its high density. The high melting point of lead also presents challenges in terms of keeping the lead in liquid form so that it can continue to circulate under lower-temperature scenarios.

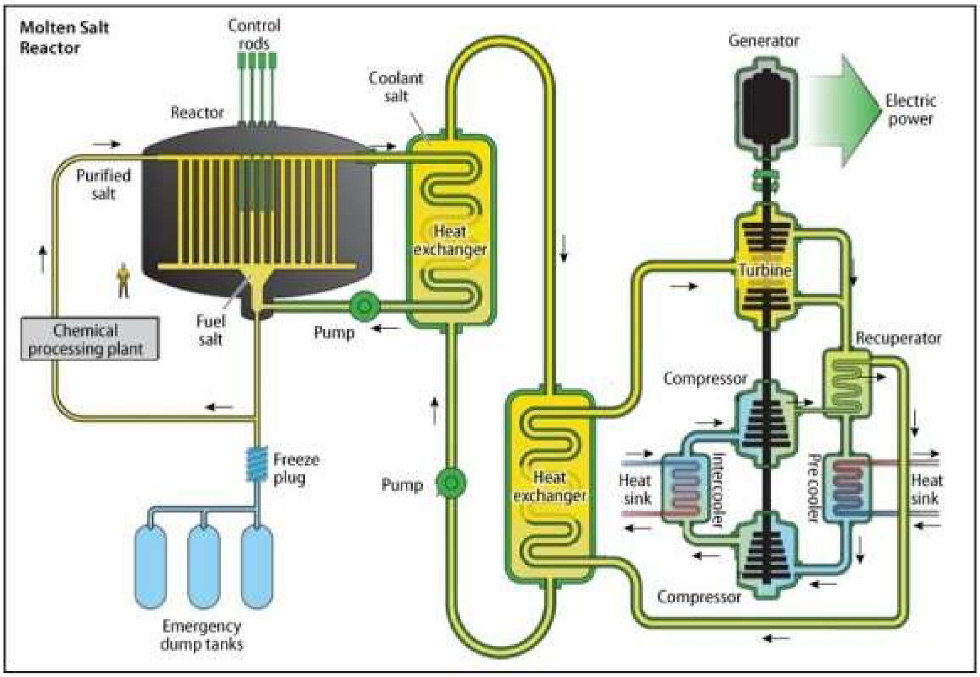
Russia is the world leader in LFR R&D, with experience building and operating seven LFRs for use in submarines. Russia has announced near-term development of two pure LFR facilities and a third facility that would be capable of using lead coolant for test purposes, in addition to other coolants.43 Members of the European Union have also announced a collaboration to develop an LFR through the Advanced Lead Fast Reactor European Demonstrator (Alfred). Other countries exploring LFR technologies include China, Japan, Korea, and Sweden. U.S. companies pursuing LFRs include Hydromine and Westinghouse.[10]

Molten Salt Reactors

Any reactor that uses molten salts as a coolant or fuel may be considered a molten salt reactor (MSR). Salt-cooled MSRs (also known as fluoride-cooled high temperature reactors or FHRs) employ molten salts to cool the core, which is composed of solid fuel blocks configured much like an HTGR. Salt-fueled MSRs, by contrast, are unique in that the fuel is not solid, but rather is dissolved in the molten salt coolant.[11]

[10] Generation IV International Forum, "Lead-Cooled Fast Reactor (LFR)," 2019
[11] Oak Ridge National Laboratory, "Fluoride-Salt-Cooled High-Temperature Reactors," January 30, 2018

Unique to MSR salt-fueled designs is a safety feature called a "freeze plug" below the reactor core, consisting of a salt plug that is cooled to a solid state. In the event of an incident that causes heat to rise in the core, the plug will melt, allowing the molten salt fuel to drain by gravity into a basin that is designed to prevent the fuel from undergoing further fission reactions and overheating. It is unknown whether spent MSR fuel could be safely stored in the long term without undergoing additional treatment after removal from the reactor.



MSR technology has been under development for decades. Two thermal-spectrum experimental reactors were built in the United States at Oak Ridge National Laboratory in the 1950s and 1960s. The first molten salt fuel irradiation tests since the completion of those early experiments were conducted in 2017 in the Netherlands, where research on waste treatment is also being pursued.

China is currently developing two prototype MSR microreactors with expected start dates in the 2020s. Terrestrial Energy, a Canadian company with a U.S. subsidiary, is in the second stage of design review with the Canadian Nuclear Safety Commission for its integral molten salt reactor (IMSR). The IMSR is the first advanced reactor design to complete phase one of the Canadian pre-licensing process. Terrestrial Energy has announced a goal of commercialization by the late 2020s. Examples of other U.S. companies developing MSRs include Alpha Tech Research Corp., Elysium Industries, Flibe Energy, Kairos Power, TerraPower, Terrestrial Energy USA, ThorCon Power, Thoreact, and Yellowstone Energy.

ADVANCED REACTOR DECISION POINTS

Advanced reactors present an opportunity for viable base load power with zero carbon emissions. The technology does present several decision points for policy makers conducting a study of the sector. The following are key issues to consider regarding advanced nuclear technology.

Costs

Investment in electricity generating technologies is largely determined on the basis of cost. Nuclear energy has historically had high capital costs, but relatively low production costs. In recent years, however, conventional nuclear plants have struggled to compete with falling electricity prices driven largely by natural gas and renewables, particularly in parts of the country that are served by competitive electricity markets.

David Schlissel, director of resource planning analysis at the Institute for Energy Economics and Financial Analysis provided testimony regarding the proposed UAMPS NuScale project to ETIC members at their May 20, 2022 meeting.

“The company has insisted its costs are firm and that the project will be economical,” Schlissel said. “But based on the track record so far and past trends in nuclear power development, this is highly unlikely.”

In his testimony, he cited the following factors as contributors to high costs:

- **Rising Construction Costs**. NuScale claims it can build the SMR for less than $3,000 per kilowatt (kW). No nuclear power plant has been built that cheaply in decades. The U.S. Department of Energy has estimated the cost will exceed $6,800/kW.
- **Longer Construction Time**. NuScale says the nuclear construction at the SMR will be completed in less than 36 months. No new reactor has been built in the U.S. in that short a time in 60 years. NuScale said in 2018 that it planned to have its SMR online by 2026. It now won’t generate electricity until mid-2029, at the earliest.
- **Operational Performance**. NuScale claims it will run at a 95% capacity factor during its entire life. None of the 93 reactors operating in the U.S. have met that goal. Only three have averaged better than 85% during their first 10 years of operation, and the median capacity factor for all U.S. reactors during these years has been only 67%.
- **Higher Costs for Participating Utilities**. The customers of communities and utilities that remain signed up for the project after construction begins will be liable for all of its costs and expenses, regardless of the total and how far above $58/MWh it ends up. They’ll even have to pay if the SMR is damaged or destroyed.

Capital costs

Conventional nuclear reactors are more expensive to build than most other electric power plants. Nuclear plants must submit to rigorous regulation and quality standards because of the risk posed by a release of radioactive materials. As a result, they require highly specialized construction materials (e.g., nuclear-grade steel), engineering knowledge, and construction expertise, all of which add to a plant's costs.

Modularity in advanced reactors is intended to increase factory production of nuclear components. Modularized construction has been shown to improve the pace of construction and reduce costs in other industries, as well as in some recent nuclear construction projects in Asia. NuScale, a U.S.-based SMR vendor, has estimated cost savings of approximately 10 percent due to modular construction of structures in its proposed SMR plant.

Operational cost

Some advanced reactor concepts show potential for reducing operational costs. Some designs would utilize simpler systems or increased automation to reduce human labor costs during operation. Many advanced reactor developers contend their designs would improve upon the thermal efficiencies of older generations of nuclear plants by operating at higher temperatures or through use of more efficient power conversion technologies. More-efficient plants may be able to reduce their payback periods relative to their less efficient peers.

Cost estimates for advanced reactors

It is difficult to accurately estimate the costs of advanced reactors. Many advanced reactor concepts remain in the early stages of design and development, and vendor companies generally do not include detailed costs in their publicly available content. Academic analyses of the costs of non-traditional reactors have produced a range of results.

Size

Advanced reactor designs come in a wide range of sizes, from less than 15 MWe to 1,500 MWe or more. In some cases, the optimal reactor size may be influenced by the particular characteristics of a given design. In others, the size may be determined by the needs of the customer or site.

The small size and modular nature of SMRs gives them the potential to expand the types of sites and applications for which nuclear energy may be considered suitable. SMR designs with multiple reactor modules may allow for size customization based on the needs of the customer or characteristics of the host site.

Waste Management

The radioactivity of nuclear waste presents waste management and facility contamination challenges that are unique to nuclear energy. Radioactivity builds up in a nuclear reactor in the accumulation of radioactive “fission products” that result from the splitting of fissile nuclei, through the accumulation of radioactive “actinides” that form when heavy atoms in the reactor core absorb a neutron but do not undergo fission, and through the generation of “activation products” in the coolant, moderator, or reactor components that occur when these materials are made radioactive by absorbing neutrons. The vast majority of the initial radioactivity in nuclear waste comes from the fission products. Due to the long half-lives of some of these radioactive materials (several hundred thousand years and longer), nuclear waste poses long-term health hazards.

In 2018, the U.S. inventory of spent nuclear fuel exceeded 80,000 metric tons of uranium (MTU).[12] This is projected to rise at a rate of approximately 1,800 MTU per year, resulting in an estimated 138,000 MTU by 2050. Because no long-term repository or consolidated storage facility for high-level nuclear waste has been licensed by NRC, newly discharged spent nuclear waste is currently stored onsite at nuclear plant locations.

Attempts to open a centralized nuclear waste holding facility have consistently stalled. Attempts to open the Yucca Mountain Repository in Nevada since the 1980s have been continually funded and stripped of funding by successive presidential administrations. Currently the project remains on hold, but proposes to provide as much as 70,000 metric tons of storage for nuclear spent-fuel.

Proponents of SMRs point to the relatively small space needed, something similar to the size of a football field, to store the country's nuclear waste. Currently, nuclear facilities store waste in secure cask's on the site of their facility.

Unconventional reactors may offer some waste management advantages over existing commercial reactors. Fast reactors, and some other unconventional reactors, would be more effective at destroying actinides compared with commercial reactors.

Actinides are not the only long-lived nuclear wastes, however; some fission products remain radioactive hazards for hundreds of thousands of years and longer. Some advanced reactors would use new or non-conventional fuel forms, such as metallic fuels or dissolved molten fuels. Some of these fuels pose additional waste management challenges as a result of their tendency to corrode storage containers or otherwise react with the environment in ways that complicate their safe storage and disposal.

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[12] Oak Ridge National Laboratory, “CURIE,” December 14, 2018

Environmental effects

Environmental impacts for any electric power source must be evaluated based on air emissions, water discharges, and waste management challenges, considering the full life cycle of the technology.

Nuclear Regulation: Federal & State Approaches

Introduction

The 2021 passage of House Bill 273 opened the door to the development of potential advanced nuclear reactor sites in Montana. The bill removed the requirement for Montana voters to approve by referendum any nuclear power construction projects and additional requirements for nuclear power set out in the Montana Major Facilities Siting Act.

House Bill 273 removed the requirement for Montana voters to approve by referendum any nuclear power construction projects and exempted facilities from requirements set out in the Montana Major Facilities Siting Act.

As advanced reactor demonstration projects develop in neighboring states, the following report examines the current nuclear regulatory mechanisms in place at the federal level, in other states, and further the current landscape in Montana.

US nuclear regulatory commission

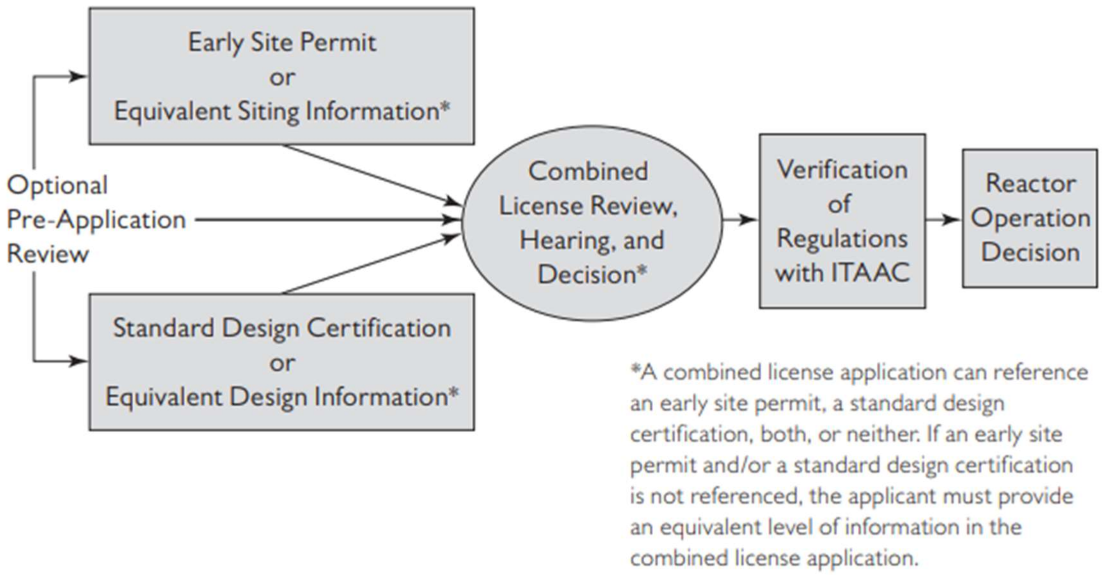
The Nuclear Regulatory Commission (NRC) is an independent federal agency responsible with licensing and providing oversight to nuclear reactors operating in the United States. The NRC began operation in 1974 as part of the Energy Reorganization Act of that year.

The commission is composed of five members appointed by the president and confirmed by the Senate to five-year terms.

The NRC conducts extensive licensing processes for new nuclear plants. In 2013, the commission conducted a review to adapt its existing process to the needs of licensing small modular reactor designs. [13]

[13] . US Nuclear Regulatory Commission, "New Reactor Licensing Process Lessons Learned Review: 10 CFR Part 52, April 2013"

NRC licensing is a two-step process that requires the approval of both an early site permit and a reactor design certification. The new "part 52" process allows for standardized design certifications aligned with the modular nature of many advanced reactor designs.



[14]

In the case of advanced reactors the process provides for:

1. the review and approval of standardized designs through a design certification (DC) rulemaking; and
2. the review and approval of a site's suitability through an early site permit (ESP).

The project is then subject to a hearing and decision process from the commission, a verification of the site's compliance with NRC Inspections, Tests, Analyses and Acceptance criteria (ITAAC) and a final operation decision.[15]

Standard design certifications

Design certification is one of two key processes to begin the licensing process. Safety issues associated with the proposed nuclear power plant design are resolved independently of a specific site prior to plant construction.

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[14] : Nuclear Regulatory Commission, "Nuclear Power Plant Licensing Process." July 2004, http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0298/br0298r2.pdf
[15] : Nuclear Regulatory Commission, "Nuclear Power Plant Licensing Process." July 2004, http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0298/br0298r2.pdf

The NRC can certify a reactor design for 15 years through the rulemaking process, independent of a specific site. An application for a standard design certification must contain information and proposed tests, inspections, analyses, and acceptance criteria for the standard design. The Advisory Committee on Reactor Safety reviews each application for a standard design certification, together with the NRC staff's safety evaluation report, in a public meeting.

If the design is acceptable, the NRC staff certifies it through a rulemaking. The NRC publishes a public notice of the proposed rule in the Federal Register seeking public comments. The NRC reviews the comments and makes any changes to the final rule, which is then published in the Federal Register and becomes an appendix to 10 CFR Part 52 of the regulations. The issues that are resolved in a design certification rulemaking are subject to a more restrictive change process than issues that are resolved through the issuance of a license. The NRC can only change certified design requirements in limited circumstances.[16]

Early Site Permits

The second key process is early site permitting. The NRC can issue an early site permit for approval of one or more sites separate from an application for a construction permit or combined license. Permits are valid for 10 to 20 years and can be renewed for an additional 10 to 20 years. They address site safety issues, environmental protection issues, and emergency management, independent of the review of a specific nuclear plant design.

The permits must contain the following information:

- the boundaries of the site, including the exclusion area for which the applicant has the authority to remove or exclude persons or property;
- characteristics of the site, including seismic, meteorologic, hydrologic, and geologic data;
- the location and description of any nearby industrial, military, or transportation facilities and routes;
- the existing and projected future population of the area surrounding the site, including a discussion of the expected low-population zone around the site and the locations of the nearest population centers;
- an evaluation of alternative sites to determine whether there is any obviously superior alternative to the proposed site;
- the proposed general location of each plant on the site;
- the number, type, and power level of the plants, or a range of possible plants planned for the site;
- the maximum radiological and thermal effluents expected;

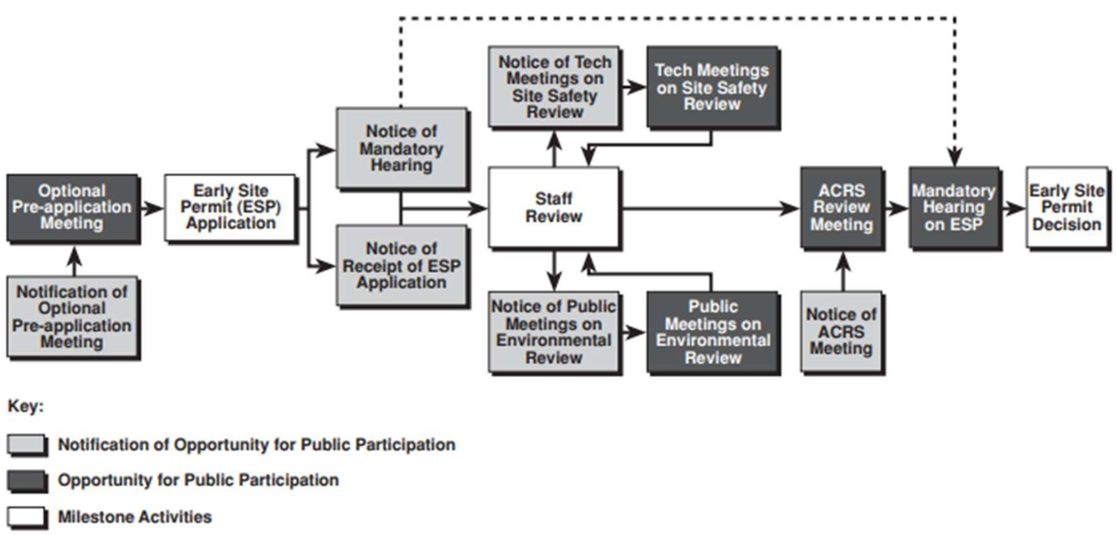
[16] Nuclear Regulatory Commission, "Nuclear Power Plant Licensing Process." July 2004, http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0298/br0298r2.pdf

- the type of cooling system expected to be used;
- radiological dose consequences of hypothetical accidents; and
- emergency management plans.

The application must also describe contacts and arrangements made with local, State, and Federal government agencies with emergency planning responsibilities, or at least show that the applicant has made a good faith effort to obtain the participation of these organizations in the emergency planning process. The NRC reviews the emergency planning information in consultation with the Federal Emergency Management Agency. The NRC documents its findings regarding site safety characteristics and emergency planning in a safety evaluation report, and environmental protection issues in draft and final environmental impact statements. [17]

After the NRC staff and ACRS complete their respective safety reviews, the NRC issues a Federal Register notice announcing a mandatory public hearing. Although not required, the NRC generally holds an introductory meeting near the proposed site 6 to 12 months before an application is submitted for an early site permit. This meeting is intended to familiarize the public with the safety and environmental aspects of the application, the planned location for the plant(s), the regulatory process, and opportunities for public participation in the licensing process.

Figure 2 - Opportunities for Public Involvement During the Review of Early Site Permits



[17] Nuclear Regulatory Commission, "Nuclear Power Plant Licensing Process." July 2004, http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0298/br0298r2.pdf

[18]In addition, the agency holds meetings with the public to discuss the scope of the NRC's environmental review. All meetings with the applicant on safety issues are also open to the public. In a public meeting, the ACRS reviews each application for an early site permit, together with the NRC staff's related safety evaluation report. Members of the public may participate in a hearing before an early site permit is issued.

Combined license review, hearing, and decision

Following the preliminary steps outlined above. Project developers must obtain the combined license that authorizes construction and conditional operation of a nuclear power plant. The application contains essentially the same information required in an application for the final operating license, including financial and antitrust information and an assessment of the need for power. The application must also describe the inspections, tests, analyses, and acceptance criteria (ITAAC) to ensure that the plant is properly constructed and will operate safely. An application for a combined license may reference a standard design certification, an early site permit, both, or neither. If the application references a standard design certification, the applicant must perform the inspections, tests, analyses, and acceptance criteria for the certified design and the site-specific design features. If the application does not reference a standard design certification, the applicant must provide complete design information, including the information that they would otherwise have submitted for a standard design certification.

The ACRS reviews each application for a combined license, together with the NRC staff's safety evaluation report, in a public meeting. After issuing a combined license, the NRC verifies that the licensee has completed the required inspections, tests, and analyses, and that the acceptance criteria have been met before the plant can operate.

The NRC publishes notices of the successful completion of the inspections, tests, and analyses. Then, at least 180 days before the scheduled date for initial loading of nuclear fuel into the reactor, the NRC publishes a notice providing an opportunity for members of the public to participate in a hearing conducted by the Atomic Safety and Licensing Board. The NRC considers a request for a hearing only if the request demonstrates that the licensee has not met the acceptance criteria in the combined license.[19]

[18] Nuclear Regulatory Commission, "Nuclear Power Plant Licensing Process." July 2004, http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0298/br0298r2.pdf
[19] Nuclear Regulatory Commission, "Nuclear Power Plant Licensing Process." July 2004, http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0298/br0298r2.pdf

Ongoing oversight

Once a site receives it operating license, the NRC maintains oversight through a series of inspection programs. The inspections focus on the following criterion areas:

- Initiating events
    - Unplanned shutdowns
    - Unplanned power changes;
- Mitigating Systems
    - Safety system functionality
    - Cooling systems
    - High pressure systems;
- Barrier Integrity;
- Emergency Preparedness;
- Public Radiation Safety;
- Occupational Radiation Safety: and
- Security.

Each calendar quarter (every 3 months), the resident NRC inspectors and the inspection staff in the regional office will review the performance of all nuclear power plants in that region as measured by the performance indicators and by inspection findings. Every 6 months, the NRC staff expands the review to include planning of inspections for the following 12-month period.

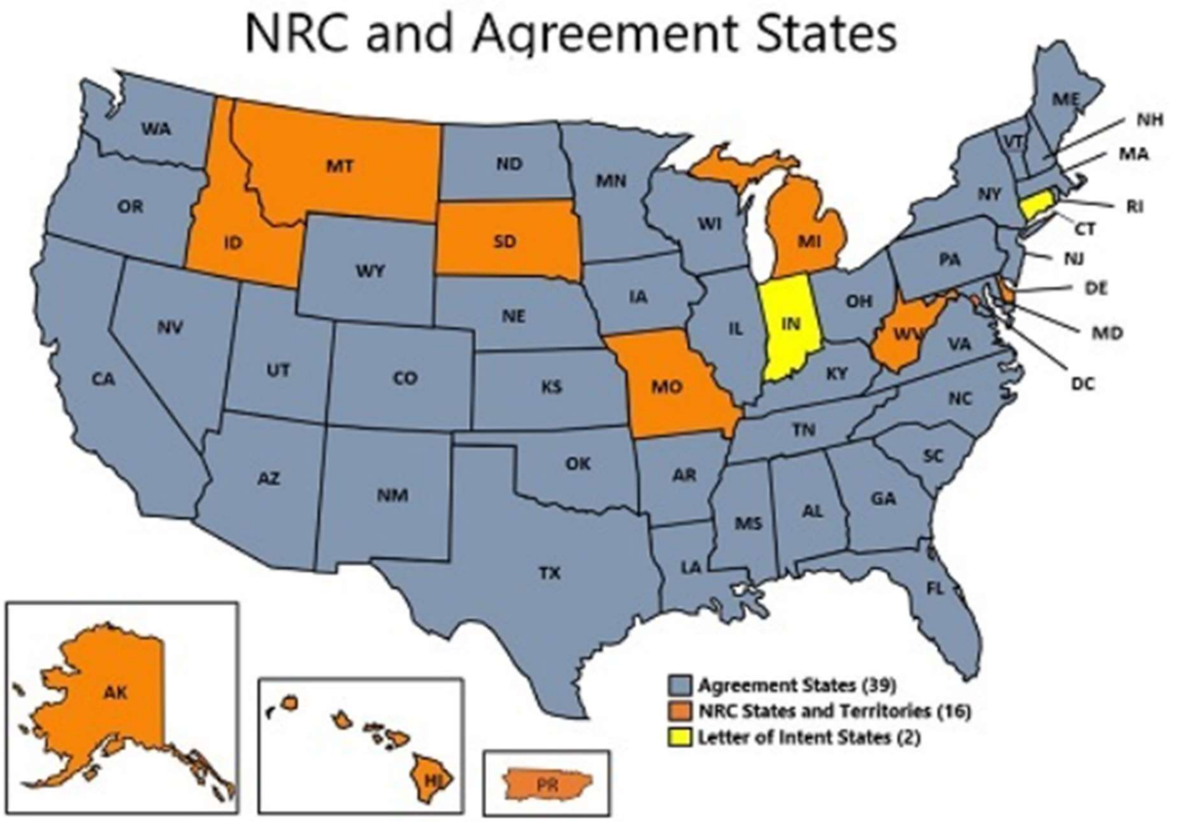
Each year, the final quarterly review involves a more detailed assessment of plant performance over the previous 12 months and preparation of a performance report, as well as the inspection plan for the following year. This review includes NRC Headquarters staff members, the regional staff, and the resident inspectors.

The NRC makes the annual performance reports available to the public on the NRC Web site. The NRC staff also holds public meetings at each plant to discuss the plant's previous year's performance.[20]

State oversight and legislative approaches

While the oversight of plant construction and operations remains with the NRC. Several states have entered into agreements with the agency to assume the commission's authority to license and inspect all byproduct, source, or special nuclear materials used, transported or possessed within their borders. The NRC has entered agreements with 39 states including Oregon, Washington, and Wyoming.

[20] Nuclear Regulatory Commission, *"Reactor Oversight Process Framework"*



21

In March, Wyoming passed House Bill 59 addressing the sighting of radioactive waste storage facilities in the state requiring the following parameters, prior to the construction of a reactor in the state:

(A) It is operated on the site of and to store the high-level radioactive waste or spent nuclear fuel produced by a nuclear power generation facility operating within the state;

(B) The facility has received a license to construct and operate from the United States nuclear regulatory commission;

(C) The report required under paragraph (vi) of this subsection has been submitted; and

(D) The operator of the facility is in compliance with paragraph (vii) of this subsection.

(vi) Not later than thirty (30) days before construction of a nuclear electric generation facility commences, the operator of the facility shall submit a report to the department that includes:

(A) The number of jobs that will be created in the planning, permitting, licensing, site analysis and preparation, purchasing, construction, transportation, operation and decommissioning of the facility and what number of those jobs would be filled by Wyoming residents;

[21] Nuclear Regulatory Commission, "State Regulation and Legislation"

(B) Local and state taxes that are estimated to be generated by all aspects of the construction, operation and decommissioning of the facility;

(C) All benefits and impacts that will accrue to the state and the local community where the facility will be located, including benefits from job training, education, communication systems, monitoring and security systems.

(vii) The operator of each facility shall send to the department copies of all publicly available reports, notifications and violations sent to or from the United States nuclear regulatory commission or the operator of the facility as soon as practicable but not later than five (5) days after the operator sends or receives the report. The operator shall also transmit all information required under this subsection to emergency management departments of the local governments where the facility is located and shall make the information available on a public website.

The bill also requires reporting prior to the construction of an advanced reactor facility that includes disclosure of:

- The number of jobs that will be created in the planning, licensing, site analysis, preparation, purchasing, construction, transportation, operation and decommissioning of the advanced nuclear reactor and what number of those jobs would be filled by Wyoming residents;
- Local and state taxes that are estimated to be generated by all aspects of the construction, operation and decommissioning of the advanced nuclear reactor;
- All benefits and impacts that will accrue to the state and local community where the advanced nuclear reactor will be located, including benefits from job training, education, communications systems, monitoring and security systems.[22]

State Level nuclear prohibitions

Twelve states prohibit to differing extents the construction of nuclear plants within their borders. The following table outlines those restrictions.

[22] Wyoming Legislature, "House Bill 59 2022"

States	Conditions	Code Reference
California	Waste Disposal Capability	West's Ann.Cal.Pub.Res.Code § 25524.1 (a) Except for the existing Diablo Canyon Units 1 and 2 owned by Pacific Gas and Electric Company and San Onofre Units 2 and 3 owned by Southern California Edison Company and San Diego Gas and Electric Company, no nuclear fission thermal powerplant requiring the reprocessing of fuel rods, including any to which this chapter does not otherwise apply, excepting any having a vested right as defined in this section, shall be permitted land use in the state or, where applicable, certified by the commission until both of the following conditions are met: (1) The commission finds that the United States through its authorized agency has identified and approved, and there exists a technology for the construction and operation of, nuclear fuel rod reprocessing plants. (2) The commission has reported its findings and the reasons therefor pursuant to paragraph (1) to the Legislature. That report shall be assigned to the appropriate policy committees for review. The commission may proceed to certify nuclear fission thermal powerplants 100 legislative days after reporting its findings unless within those 100 legislative days either house of the Legislature adopts by a majority vote of its members a resolution disaffirming the findings of the commission made pursuant to paragraph (1).
Connecticut	Waste Disposal Capability	C.G.S.A. § 22a-136 No construction shall commence on a fifth nuclear power facility until the Commissioner of Environmental Protection finds that the United States Government, through its authorized agency, has identified and approved a demonstrable technology or means for the disposal of high level nuclear waste. As used in this section, "high level nuclear waste" means those aqueous wastes resulting from the operation of the first cycle of the solvent extraction system or equivalent and the

		concentrated wastes of the subsequent extraction cycles or equivalent in a facility for reprocessing irradiated reactor fuel and shall include spent fuel assemblies prior to fuel reprocessing.
Hawaii	Legislative Approval	Const. Art. 11, § 8 No nuclear fission power plant shall be constructed or radioactive material disposed of in the State without the prior approval by a two-thirds vote in each house of the legislature
Illinois	Waste Disposal Capability or Legislative Approval	220 ILCS 5/8-406 (c) After the effective date of this amendatory Act of 1987, no construction shall commence on any new nuclear power plant to be located within this State, and no certificate of public convenience and necessity or other authorization shall be issued therefor by the Commission, until the Director of the Illinois Environmental Protection Agency finds that the United States Government, through its authorized agency, has identified and approved a demonstrable technology or means for the disposal of high level nuclear waste, or until such construction has been specifically approved by a statute enacted by the General Assembly.
Maine	Waste Disposal Capability and Voter Approval	35-A M.R.S.A. § 4302 1. Question submitted to voters. Prior to the construction of any nuclear power plant within the State, the question of approving that construction must be submitted to the voters of the State in the manner prescribed by law for holding a statewide election. This question must be submitted to the legal voters of the State at the next following statewide election. The municipal officers and plantation assessors of this State shall notify the inhabitants of their respective cities, towns and plantations to meet, in the manner prescribed by law for holding a statewide election, to vote on the acceptance or rejection of construction by voting on the following question:

		"Do you approve construction of the nuclear power plant proposed for (insert locations)?" 35-A M.R.S.A. § 4373 No construction may commence on a nuclear power plant, until the Public Utilities Commission has certified it under this subchapter. 35-A M.R.S.A. § 4374 The commission may certify a nuclear power plant if it finds that: 1. Federal Government identification and approval of technology. The Federal Government, through its authorized agency, has identified and approved a demonstrable technology or means for the disposal of high-level nuclear waste; 2. Waste storage facilities operational. Specific facilities with adequate capacity to contain high-level nuclear waste are in actual operation, or will be in operation, at the time the nuclear power plant being certified requires the means for the disposal of high-level nuclear waste; and 3. Proposal for disposal is in conformity. The disposal of high-level nuclear waste proposed for any nuclear power plant to be certified according to this subchapter is in full conformity with the technology approved by the authorized agency of the Federal Government.
Massachusetts	Voter Approval or Legislative Approval	M.G.L.A. 164 App. § 3-3 No new nuclear power plant shall be constructed or operated within the Commonwealth unless:

		(a) construction and operation of the proposed nuclear power plant have been approved by a majority of the voters voting thereon in a state-wide general election; and (b) the General Court has found, and has so certified by resolution duly adopted by majority vote of the members of each House: (i) that there exists an operating, federally-licensed facility for the timely and economical permanent disposal of high-level radioactive wastes generated by the proposed nuclear power plant; (ii) that an adequate emergency preparedness plan for the proposed nuclear power plant has been developed, approved, and implemented by the Commonwealth; (iii) that effective emission standards applicable to the proposed nuclear power plant have been promulgated by the Commonwealth to protect the public against health and safety hazards of radioactive air pollutants traceable to nuclear power plants within the Commonwealth; (iv) that there exists a demonstrated, federally-approved technology or means for the timely and economical decommissioning, dismantling, and disposal of the proposed nuclear power plant; and (v) that the proposed nuclear power plant offers the optimal means of meeting energy needs from the combined standpoints of overall cost, reliability, safety, environmental impact, land-use planning, and avoiding potential social and economic dislocation.
Minnesota	Complete Ban	M.S.A. § 216B.243 Subd. 3b. Nuclear power plant; new construction prohibited; relicensing. (a) The commission may not issue a certificate of need for the construction of a new nuclear-powered electric generating plant.

		(b) Any certificate of need for additional storage of spent nuclear fuel for a facility seeking a license extension shall address the impacts of continued operations over the period for which approval is sought.
New Jersey	Waste Disposal Safety	N.J.S.A. 13:19-11 The construction and operation of a nuclear electricity generating facility shall, however, not be approved by the commissioner unless the commissioner finds that the proposed method for disposal of radioactive waste material to be produced or generated by the facility will be safe, conforms to standards established by the Nuclear Regulatory Commission and will effectively remove danger to life and the environment from such waste material.
New York	Ban in a limited area	Public Authorities Law § 1020-t In no event shall the authority construct or operate a nuclear powered facility in the service area (which is defined in McKinney's Public Authorities Law § 1020-b as “the counties of Suffolk and Nassau and that portion of the county of Queens constituting LILCO's [the Long Island lighting company] franchise area as of the effective date of this title.”
Oregon	Waste Disposal Capability and Voter Approval	O.R.S. § 469.595 Before issuing a site certificate for a nuclear-fueled thermal power plant, the Energy Facility Siting Council must find that an adequate repository for the disposal of the high-level radioactive waste produced by the plant has been licensed to operate by the appropriate agency of the federal government. The repository must provide for the terminal disposition of such waste, with or without provision for retrieval for reprocessing. O.R.S. § 469.597

		(1) Notwithstanding the provisions of ORS 469.370, if the Energy Facility Siting Council finds that the requirements of ORS 469.595 have been satisfied and proposes to issue a site certificate for a nuclear-fueled thermal power plant, the proposal shall be submitted to the electors of this state for their approval or rejection at the next available statewide general election. The procedures for submitting a proposal to the electors under this section shall conform, as nearly as possible to those for state measures, including but not limited to procedures for printing related material in the voters' pamphlet. (2) A site certificate for a nuclear-fueled thermal power plant shall not be issued until the electors of this state have approved the issuance of the certificate at an election held pursuant to subsection (1) of this section.
Rhode Island	Legislative Approval	Gen.Laws 1956, § 42-64-14.1 The final approval or denial of a project plan for the location and construction of an oil refinery or a nuclear plant within the state is hereby expressly reserved to the general assembly notwithstanding any general or public law or ordinance to the contrary, and exclusively within the jurisdiction of the general assembly. The exclusive jurisdiction is vested in the general assembly notwithstanding any other general, special, or public law to the contrary, including, but not limited to, those laws granting regulatory powers to the cities and towns, and any ordinances enacted pursuant to these laws.
Vermont	Legislative Approval	30 V.S.A. § 248 (e)(1) Before a certificate of public good is issued for the construction of a nuclear energy generating plant within the state, the public service board shall obtain the approval of the general assembly and the assembly's determination that the construction of the proposed facility will promote the general welfare. The public service board shall advise the general assembly of any

		petition submitted under this section for the construction of a nuclear energy generating plant within this state, by written notice delivered to the speaker of the house of representatives and to the president of the senate. The department of public service shall submit recommendations relating to the proposed plant, and shall make available to the general assembly all relevant material. The requirements of this subsection shall be in addition to the findings set forth in subsection (b) of this section.[23]

Montana's nuclear regulatory environment

The 2021 passage of House Bill 273 enacted two notable changes in nuclear policy in Montana.

1. The bill repealed the law authorizing Montana citizens through statewide vote to approve or reject the construction of a proposed nuclear facility.
2. The bill removed additional nuclear power requirements from the Major Facility Siting Act.

Major Facility Siting act overview

The Montana Major Facility Siting Act (MFSA) provides a mechanism for the Montana Department of Environmental Quality to review the siting and construction of certain energy facilities.

MFSA, may require a certificate of compliance for certain types of energy-related projects, including:

- Pipelines (except water pipelines) greater than 25 inches in inside diameter and 50 miles in length.
  - The Federal Energy Regulatory Commission (FERC) has primacy over permitting of interstate natural gas pipelines. In the case of natural gas pipelines that meet the diameter and length requirements of MFSA, DEQ must file a state recommendation with FERC
- Electric transmission lines with a design capacity of more than 69 kilovolts.
- Facilities using geothermal resources to produce, or hydroelectric facilities capable of generating, at least 50 megawatts of power.
- Associated facilities such as transportation links, pump stations and other facilities associated with the delivery of energy are also included.

[23] National Conference of State Legislatures, "State Restrictions on New Nuclear Power Facility Construction."

The following types of facilities are exempt from MFSA:

- Electric transmission lines of a design capacity 230 kilovolts or less and 10 miles or less in length.
- Electric transmission lines or pipelines that would otherwise be covered by MFSA, but for which the person planning to construct the line has obtained right-of-way agreements or options for a right-of-way from more than 75 percent of the owners who collectively own more than 75 percent of the property along the centerline.
- Certain electric transmission lines that are collectively less than 150 miles in length and required under state or federal law for certain electrical generation or storage facilities to interconnect to a regional transmission grid or secure firm transmission service to use the grid.
- Upgrades to existing transmission lines to increase capacity.
- Energy storage facilities.
- Transmission substations, switchyards, voltage support, or other control equipment.

The definition of a facility under MFSA does not include wind farms, solar farms, or natural gas or coal fired electrical generating units. House Bill 273 also removed Nuclear power from the definitions of a facility under MFSA.

Power plants, however, are subject to DEQ air, wastewater, storm water, and hazardous waste permitting.

HB 273 repealed language

House Bill 273 repealed several sections of MFSA regarding nuclear power the most notable sections removed the people of Montana's right to determine whether nuclear facilities are built in the state and additional requirements for nuclear facilities. The notable repealed sections are as follows:

75-20-1201. Purpose -- findings as to nuclear safety -- reservation of nuclear facility approval powers to the people. (1) The people of Montana find that substantial public concern exists regarding nuclear reactors and other major nuclear facilities, including the following unresolved issues:

(a) the generation of waste from nuclear facilities, which remains a severe radiological hazard for many thousands of years and to which no means of containment assuring the protection of future generations exists;

(b) the spending of scarce capital to pay the rapidly increasing costs of nuclear facilities, preventing the use of that capital to finance renewable energy sources which hold more promise for supplying useful energy, providing jobs, and holding down energy costs;

(c) the liability of nuclear facilities to sudden catastrophic accidents which can affect large areas of the state, thousands of people, and countless future generations;

(d) the refusal of utilities, industry, and government to assume normal financial responsibility for compensating victims of such nuclear accidents;

(e) the impact of nuclear facilities on the proliferation of nuclear bombs and terrorism;

(f) the increasing pattern of abandonment of used nuclear facilities by their owners, resulting in radiological dangers to present and future societies as well as higher public costs for perpetual management; and

(g) the detrimental effect of the large uranium import program necessary to the expansion of nuclear power on American energy independence, defense policy, and economic wellbeing.

(2) Therefore, the people of Montana reserve to themselves the exclusive right to determine whether major nuclear facilities are built and operated in this state.

75-20-1203. Additional requirements for issuance of a certificate for the siting of a nuclear facility. (1) The board may not issue a certificate to construct a nuclear facility unless it finds that:

(a) no legal limits exist regarding the rights of a person or group of persons to bring suit for and recover full and just compensation from the designers, manufacturers, distributors, owners, and/or operators of a nuclear facility for damages resulting from the existence or operation of the facility; and further, that no legal limits exist regarding the total compensation which may be required from the designers, manufacturers, distributors, owners, and/or operators of a nuclear facility for damages resulting from the existence or operation of such facility;

(b) the effectiveness of all safety systems, including but not limited to the emergency core cooling systems, of such nuclear facility has been demonstrated, to the satisfaction of the board, by the comprehensive laboratory testing of substantially similar physical systems in actual operation;

(c) the radioactive materials from such nuclear facilities can be contained with no reasonable chance, as determined by the board, of intentional or unintentional escape or diversion of such materials into the natural environment in such manner as to cause substantial or long-term harm or hazard to present or future generations due to imperfect storage technologies, earthquakes or other acts of God, theft, sabotage, acts of war or other social instabilities, or whatever other causes the board may deem to be reasonably possible, at any time during which such materials remain a radiological hazard; and

(d) the owner of such nuclear facility has posted with the board a bond totaling not less than 30% of the total capital cost of the facility, as estimated by the board, to pay for the decommissioning of the facility and the decontamination of any area contaminated with radioactive materials due to the existence or operation of the facility in the event the owner fails to pay the full costs of such decommissioning and decontamination. Excess bond, if any, shall be refunded to the owner upon demonstration, to the satisfaction of the board, that the site and environs of the facility pose no radiological danger to present or future generations and that whatever other conditions the board may deem reasonable have been met.

(2) Nothing in this section shall be construed as relieving the owner of a nuclear facility from full financial responsibility for the decommissioning of such facility and decontamination of any area contaminated with radioactive materials as a result of the existence or operation of such facility at any time during which such materials remain a radiological hazard.

75-20-1204. Annual review of evacuation and emergency medical aid plans. (1) The governor shall annually publish, publicize, and release to the news media and to the appropriate officials of affected communities, in a manner designed to inform residents of the affected communities, the entire evacuation plan specified in the licensing of each certified nuclear facility within this state. Copies of such plan shall be made available to the public upon request at no more than the cost of reproduction.

(2) The governor shall establish procedures for annual review by state and local officials of established evacuation and emergency medical aid plans with regard for, but not limited to, such factors as the adequacy of such plans, changes in traffic patterns, population densities, the locations of schools, hospitals, and industrial developments, and other factors as requested by locally elected representatives.

Conclusion

House Bill 273 puts nuclear facilities on a similar regulatory footing to coal and natural gas-fired generating plants, while removing the additional requirements for nuclear facilities in the state. The Nuclear Regulatory commission's licensing and oversight processes are extensive. Although the day-to-day operational oversight of nuclear plants remains the jurisdiction of the federal government. States are taking widely differing approaches ranging from outright prohibitions of nuclear power to legislation aimed at aligning with federal oversight and managing waste at the state level.

APPENDIX A:

ENERGY AND TELECOMMUNICATIONS INTERIM COMMITTEE MEMBERS

Before the close of each legislative session, the House and Senate leadership appoint lawmakers to interim committees. The members of the Energy and Telecommunications Interim Committee, like most other interim committees, serve one 20-month term. Members who are reelected to the Legislature, subject to overall term limits and if appointed, may serve again on an interim committee. This information is included in order to comply with 2-15-155, MCA.

Senate Members

Senator Mary McNally, Chair
PO Box 20584
Billings, MT 59104
Ph: (406) 671-1376
Email: Mary.McNally@mtleg.gov

Senator Terry Gauthier, Vice Chair
PO Box 4939
Helena, MT 59604
Ph: (406) 461-0744
Email: mrmac570@me.com

Senator Duane Ankney
PO Box 2138
Colstrip, MT 59323
Ph: (406) 740-0629
Email: goodwind1.duane@gmail.com

Senator Janet Ellis
PO Box 385
Helena, MT 59624
Ph: (406) 431-9157
Email: Janet.Ellis@mtleg.gov

House Members

Representative Michele Binkley
PO Box 1601
Hamilton, MT 59840
Ph: (406) 375-0291
Email: michele@binkleyformontana.com

Representative Steven Galloway
202 Sun Prairie Road
Great Falls, MT 59404
Ph: (406) 727-4963
Email: galloway4mt@gmail.com

Representative Denise Hayman
PO Box 6115
Bozeman, MT 59771
Ph: (406) 579-1986
Email: Denise.Hayman@mtleg.gov

Representative Andrea Olsen
622 Rollins Street
Missoula, MT 59801
Ph: (406) 543-2666
Email: Andrea.Olsen@mtleg.gov

Representative Katie Sullivan
PO Box 7853
Missoula, MT 59807
Ph: (406) 616-3914
Email: Katie.Sullivan@mtleg.gov

Representative Katie Zolnikov
PO Box 51343
Billings, MT 59105
Ph: (406) 690-1684
Email: Katie.Zolnikov@mtleg.gov

Energy and Telecommunications Interim Committee Staff
Jameson Walker, Attorney | Trevor Graff, Legislative Research Analyst | Nadine Spencer, Secretary