



OKLAHOMA
Corporation Commission

**Oklahoma Nuclear Energy Generation
Feasibility Study**

Table of Contents

Acronyms	vi
Executive Summary	viii
1.0 Introduction	1
1.1 Study Objective and Overview	1
1.2 Stakeholder and Public Engagement	3
1.2.1 Notice of Inquiry	3
1.2.2 Legislative History	10
1.3 A Brief History of Nuclear Power	17
1.4 Public Perceptions.....	21
1.4.1 Public Support for Nuclear Energy	22
1.4.2 Risk and Benefit Perceptions	23
1.4.3 Trust in Key Actors.....	25
1.5 U.S. Nuclear Energy Advancement Strategy.....	30
1.5.1 Fiscal Responsibility Act.....	30
1.5.2 ADVANCE Act.....	30
1.5.3 Executive Orders.....	31
2.0 Nuclear Technology, Siting, and Licensing.....	31
2.1 Nuclear Plant Designs and Timeline for Development.....	31
2.1.1 Advanced Large Light-Water Reactors.....	32
2.1.2 Light-Water Small Modular Reactors.....	32
2.1.3 Non-Light-Water Reactors.....	33
2.1.4 Nuclear Project Timelines.....	33
2.2 Nuclear Siting Considerations	50
2.2.1 Environmental and Safety Siting Considerations	50
2.2.1.1 NRC Siting Considerations	50
2.2.1.2 Nuclear Industry Siting Considerations	51
2.2.1.3 State Siting Considerations.....	52
2.2.2 Considerations for Co-Locating Nuclear Facilities at Military Installations.....	53
2.2.2.1 Department of Defense Energy Resilience Considerations	54
2.2.2.2 Military-Adjacent Siting as a Resilience Enabler	54
2.2.2.3 Advanced Nuclear Energy Within a Resilience Portfolio	55
2.2.2.4 Ongoing Federal Alignment and Strategic Awareness	55
2.2.3 Summary of Key Siting Considerations for Oklahoma	55
2.2.3.1 Transmission Considerations.....	56
2.2.3.2 Water Sources and Availability	56
2.2.3.3 Safety and Hazard Considerations.....	57
2.2.3.4 Land Use Considerations.....	59

2.2.3.5	Ecological Considerations.....	60
2.3	Nuclear Facility Licensing Overview	69
2.3.1	Federal Licensing and Regulatory Oversight.....	69
2.3.2	Typical State Permits and Certifications	71
2.3.2.1	Discharge to Surface Water Permits	71
2.3.2.2	Air Quality Emissions Permit.....	72
2.3.2.3	Hazardous Waste Permit	72
2.3.2.4	Water Use Permits.....	72
3.0	Economic Considerations	75
3.1	Benefits.....	75
3.1.1	Economic Development and Tax Base.....	75
3.1.2	Employment and Workforce	76
3.1.2.1	Executive Overview	76
3.1.2.2	Oklahoma Workforce Within the National Context	77
3.1.2.3	SMR-Specific Workforce Demand.....	78
3.1.2.4	Oklahoma’s Industrial Base and Workforce Assets	80
3.1.2.5	Examples of Relevant NAICS Sectors	80
3.1.2.6	Educational Infrastructure and Talent Pipeline.....	81
3.1.2.7	Economic Impact and Wage Analysis	82
3.1.2.8	An Example Road Map	83
3.1.2.9	Conclusion.....	83
3.2	Existing Electric Generation Market	87
3.3	First-of-a-Kind Projects and Rate-Recovery Considerations.....	88
3.4	Summary of Federal Funding Incentives	89
3.4.1	Infrastructure Investment and Jobs Act	89
3.4.2	Inflation Reduction Act	89
3.4.3	ADVANCE Act.....	90
4.0	Oklahoma State Policy Considerations for New Nuclear	91
4.1	Legislative and Policy Consideration	91
4.1.1	Legal and Regulatory Environment, Present and Future	91
4.1.1.1	Present	91
4.1.1.2	Future	96
4.1.2	State-Level Policy Options	97
4.1.2.1	Establishing Authorities, Task Forces, or Commissions	98
4.1.2.2	Supply Chain and Manufacturing	99
4.1.2.3	Workforce Development	100
4.1.2.4	Enabling Development.....	101
5.0	Conclusions.....	101

6.0 References 105

List of Tables

Table 2.3-1 Operating Nuclear Plants in the United States 73

List of Figures

Figure 1.3-1 Boiling Water Reactor 19

Figure 1.3-2 Pressurized Water Reactor 20

Figure 1.4-1 Support for New Reactors, New Plants, and Advanced Reactors
in the United States, 2006–2025 27

Figure 1.4-2 Public Perceptions of Nuclear Energy Mapped Across
Risk-Benefit Quadrants, 2017–2025 28

Figure 1.4-3 Public Trust in Key Actors Involved in Nuclear Energy, 2017–2025 29

Figure 2.1-1 Westinghouse AP1000 35

Figure 2.1-2 Small Modular Reactor Specifications 36

Figure 2.1-3 Sodium-Cooled Fast Reactor Diagram 37

Figure 2.1-4 Molten Salt Reactor Diagram 38

Figure 2.1-5 Very-High-Temperature Reactor Diagram 39

Figure 2.1-6 Supercritical Water-Cooled Reactor Diagram 40

Figure 2.1-7 Lead-Cooled Fast Reactor Diagram 41

Figure 2.1-8 Gas-Cooled Fast Reactor Diagram 42

Figure 2.1-9 Map of Generation IV Designers 43

Figure 2.1-10 Molten Fluoride Salt-Cooled High-Temperature Reactor and
Sodium-Cooled Fast Reactor Comparison 44

Figure 2.1-11 High-Temperature Reactor and Gas-Cooled Fast Reactor Comparison 45

Figure 2.1-12a Micro-Reactor Specifications, Part 1 46

Figure 2.1-12b Micro-Reactor Specifications, Part 2 47

Figure 2.1-13 Molten Salt Reactor Specifications 48

Figure 2.1-14 DOE Nuclear Power Plant Construction Timeline 49

Figure 2.2-1 EPRI Siting Process Example 61

Figure 2.2-2 Transmission Considerations 62

Figure 2.2-3 Water Sources and Availability Considerations 63

Figure 2.2-4	Seismic Considerations	64
Figure 2.2-5	Hazardous Land Use Considerations	65
Figure 2.2-6	Population Considerations.....	66
Figure 2.2-7	Land Use Considerations	67
Figure 2.2-8	Threatened and Endangered Species Map	68
Figure 3.1-1	Workforce Timeline by Reactor Type.....	84
Figure 3.1-2	Role Equivalents and Gaps	85
Figure 3.1-3	Oklahoma Wages Versus National Nuclear Benchmark	86

List of Attachments

- Attachment A: Oklahoma Nuclear Energy Generation Feasibility Study Working Group Members
- Attachment B: Stakeholder Responses to Oklahoma Nuclear Energy Generation Notice of Inquiry (Case Number GD2025-000004)
- Attachment C: “Advanced Nuclear Energy Economics.” Technical Conference Presentation by the Nuclear Energy Institute to the Oklahoma Corporate Commission
- Attachment D: “Donald C. Cook Nuclear Plant.” Technical Conference Presentation by American Electric Power to the Oklahoma Corporate Commission
- Attachment E: “Air Force Modular Reactor Discussion.” Technical Conference Presentation by HDR, Inc., and City of Altus to the Oklahoma Corporate Commission
- Attachment F: “Occlusion Nuclear Solutions.” Technical Conference Presentation by Occlusion Solutions to the Oklahoma Corporate Commission
- Attachment G: “Perspectives on Nuclear Challenges in Oklahoma.” Technical Conference Presentation by Western Farmers Electric Cooperative to the Oklahoma Corporate Commission
- Attachment H: “Nuclear Options in Resource Planning.” Technical Conference Presentation by Oklahoma Gas and Electric Company to the Oklahoma Corporate Commission
- Attachment I: “SSP1011 Nuclear Power Plant Capability Study Synopsis.” Presented to the Oklahoma Senate Energy and Telecommunications Committee
- Attachment J: “SSP1013 and SSP1061 Study Synopsis.” Presented to the Oklahoma Senate Energy and Telecommunications Committee

Acronyms

ADVANCE Act	Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024
AEA	Atomic Energy Act of 1946
AEC	Atomic Energy Commission
AEP	American Electric Power
AI	artificial intelligence
Air Force	U.S. Air Force
API	American Petroleum Institute
Army	U.S. Army
ASME	American Society of Mechanical Engineers
BWR	boiling water reactor
BWXT	BWX Technologies
CFR	Code of Federal Regulations
Cook	Donald C. Cook Nuclear Power Plant
CPA	construction permit application
CWIP	Construction Work in Progress
DEQ	Oklahoma Department of Environmental Quality
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
EE	Energy and Environment
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
FEMA	Federal Emergency Management Agency
FOAK	first-of-a-kind
FRA	Fiscal Responsibility Act of 2023
GE	General Electric
Gen III/III+	Generation III/III+
Gen IV	Generation IV
GW	gigawatt
HALEU	high-assay low-enriched uranium
HB	House Bill
IOU	investor-owned utility
IPPRA	Institute for Public Policy Research and Analysis
IRA	Inflation Reduction Act of 2022
IRP	integrated resource plan
IURC	Indiana Utility Regulatory Commission
kW	kilowatt
LWR	light-water reactor
MW	megawatts

MWe	megawatts electric
MWh	megawatt-hour
NAICS	North American Industry Classification System
NEA	Nuclear Energy Agency
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
NOAK	nth-of-a-kind
NOI	Notice of Inquiry
NQA-1	Nuclear Quality Assurance
NRC	U.S. Nuclear Regulatory Commission
OAC	Oklahoma Administrative Code
OCC	Oklahoma Corporation Commission
OG&E	Oklahoma Gas and Electric Company
OSU	Oklahoma State University
OU	University of Oklahoma
OWRB	Oklahoma Water Resources Board
PUD	Public Utility Division
PWR	pressurized water reactor
RFP	request for proposals
RIMS II	regional input-output modeling system
SB	Senate Bill
SDC	Seismic Design Category
Siting Guide	Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (EPRI)
SMR	small modular reactor
SPP	Southwest Power Pool
the Commission	Oklahoma Corporation Commission
TU	University of Tulsa
U.S.	United States
USFWS	U.S. Fish and Wildlife Services
Westinghouse	Westinghouse Electric Company, LLC
WFEC	Western Farmers Electric Cooperative

Executive Summary

In 2025, the Oklahoma State Legislature passed Senate Bill (SB) 130 requiring the Oklahoma Corporation Commission (OCC; the Commission) to conduct a Nuclear Energy Feasibility Study to assess the feasibility of establishing nuclear energy generation in Oklahoma. The legislation also identified a series of topics to be addressed as part of the study. In further support of this effort, the OCC, as provided for in the legislation, opened a Notice of Inquiry (NOI) seeking input from stakeholders on the question of nuclear energy feasibility in Oklahoma and the related topics specified by the legislature.

To conduct this study, the OCC partnered with the Hamm Institute for American Energy to organize a working group consisting of individuals with deep technical knowledge and experience from a wide range of entities with interests related to nuclear energy. Also consistent with the legislation, the OCC engaged a consultant, Enercon Services, Inc., to develop the study from the information collected through the working group as well as to contribute their significant expertise in the nuclear space.

The sections that follow provide substantial details on nuclear power, including reactor technologies and their differences, related costs and development timelines, site selection considerations, and issues such as water sources, safety, and environmental and ecological considerations. Public perceptions of nuclear power are considered and analyzed. Economic impacts, workforce development, various policy considerations, and activities in other states are assessed. The financial challenges of nuclear development, with its significant upfront costs relative to other generation technologies, are discussed, along with potential funding options. It should be emphasized that the cost of nuclear generation relative to alternatives poses a significant obstacle to development, absent proactive state and federal policy.

To the extent that state policymakers seek further action to investigate the development of nuclear generation in Oklahoma, a key next step would be the establishment of an ongoing authority, task force, state office, or other coordinating entity tasked with developing a strategic plan for nuclear generation deployment in Oklahoma. Such a coordinating entity could focus on defining the components necessary to attract, encourage, and support nuclear energy generation in the state. This coordinating entity could bring together Oklahoma stakeholders with demonstrated expertise in nuclear energy development as well as energy policy makers and liaisons from relevant government agencies. Further, this entity could organize subgroups to address critical issues.

In summary, while there are no apparent technical barriers preventing the development of nuclear energy in the state, there are challenges, including timelines, financing considerations, policy determinations, economic impacts, and public perception. The study finds that developing nuclear energy generation in Oklahoma is technically feasible but recognizes several areas of policy that would need to be proactively addressed by state leaders for nuclear development to be realized, particularly costs relative to alternative generation sources.

1.0 INTRODUCTION

1.1 Study Objective and Overview

SB 130 (2025) of the Oklahoma State Legislature, as codified under the Oklahoma Energy Initiative Act [17 O.S. Section (§) 803], directed the OCC to conduct a technical and legal feasibility study on nuclear energy generation in Oklahoma. The OCC was authorized to conduct an NOI and to utilize the information collected from stakeholders in conjunction with a consulting firm. The OCC held such an NOI in the form of CASE NO. GD2025-000004, IN RE: INQUIRY OF THE OKLAHOMA CORPORATION COMMISSION TO STUDY THE TECHNICAL AND LEGAL FEASIBILITY OF NUCLEAR ENERGY GENERATION IN OKLAHOMA, issued August 27, 2025, and amended on September 2, 2025. SB 130 details the topics to be evaluated and considered within the feasibility study. (OCC 2025) The following study is a result of these directives, which were effectuated through the establishment of a working group consisting of a wide range of industry professionals and stakeholders, the OCC's NOI, and the engagement of Enercon Services, Inc., an outside consulting firm.

The study's overall objective is to identify and provide insights that inform state-level policy decisions in the consideration of nuclear energy generation in Oklahoma as a means to meet state goals and support possible beneficial development efforts, while giving consideration to financial, safety, and environmental impacts.

In accordance with the Senate bill referenced above, the Nuclear Energy Generation Feasibility Study considered the following topics, with the actual language from the ***bold and italicized*** text and references to the sections of the study that address each topic:

- ***Advantages and disadvantages of generating nuclear energy in this state, including, but not limited to, the economic and environmental impacts.*** Discussions of the economic considerations and benefits are included in Section 3.0. Environmental considerations and impacts are included in Section 2.2.1 of the report.
- ***Methods to maximize existing workforce and products made in this state for the construction of nuclear energy generation facilities.*** For a discussion of existing workforce, economic, and production possibilities, see Sections 3.1.1 and 3.1.2.
- ***Design characteristics, including recommendations for design specification and site selection.*** Nuclear plant designs, timelines for development, siting considerations, and licensing are covered in Section 2.0.
- ***Environmental and ecological impacts.*** Section 2.2.1 addresses environmental and ecological impacts.

- **Land and siting criteria, including specific geographic areas that are best suited for new nuclear generation, as well as cities near military bases that may use new nuclear electric generation to meet the energy resilience requirements of 10 U.S.C. § 2920.** Key siting considerations and possible co-location opportunities are covered in Section 2.2.
- **Safety criteria.** Safety criteria for advanced nuclear reactors are referenced in comments from stakeholders and the public in Section 1.2. The safety features of advanced reactors are discussed in Sections 2.1 and 2.2.1.
- **Engineering and cost-related information.** Engineering information is provided in Section 2.0, while Section 3.3 discusses project costs and cost-recovery options.
- **Small modular nuclear reactor and microreactors capability.** A discussion of different types of advanced nuclear reactors and their capabilities can be found in Section 2.0.
- Socioeconomic factors, including, but not limited to:
 - **Workforce education, training, and development.** Workforce, education, and suggestions can be found in Section 3.1.2.
 - **Local and state tax base.** For a discussion of economic development and the tax base, see Section 3.1.1.
 - **Supply chain capability.** For a discussion of supply chain possibilities, see Section 3.1.2.1.
 - **Permanent and temporary job creation.** For the specific workforce demand and adapting the existing workforce to nuclear energy generation, see Section 3.1.2.
 - **Timeline for development, including areas of potential efficiencies, and potential leveraging of existing facilities within this state.** The timeline for development of nuclear reactors is covered in Section 2.1.
 - **Literature review of studies that have assessed the potential impact of nuclear energy generation.** References used in this report are provided in Section 6.0.
 - **Policy recommendations to support nuclear energy generation, including a survey of federal programs to financially assist the development of a nuclear project in this state.** Cost-recovery options are discussed in Section 3.3, and federal funding incentives are summarized in Section 3.4. Policy recommendations to support nuclear energy generation can be found in Section 5.0.

1.2 Stakeholder and Public Engagement

To assist with this study, a working group was facilitated by the Public Utility Division (PUD) of the OCC, in conjunction with the Hamm Institute for American Energy, to collect relevant information, consider the issues raised in the statute, and assist with developing this report. The working group consists of members with a wide range of expertise, including representatives from retail electric suppliers, regulatory bodies, other state departments, nuclear advocate groups, the United States (U.S.) military, community leaders, and municipally owned electric utilities. The working group met weekly during the development of this report to discuss relevant topics and present information. A list of the individuals and organizations participating in the working group is included in Attachment A.

1.2.1 Notice of Inquiry

In addition to the working group's efforts, on August 27, 2025, the OCC issued an NOI to receive public comments and input regarding the Oklahoma Nuclear Energy Generation Feasibility Study. This NOI provided a broad forum for all interested parties, both stakeholders and the public, to provide comments and participate in the consideration of nuclear generation in Oklahoma.

In Part A of the NOI, the OCC requested interested persons to respond and provide comment(s) on the following requirements of 17 O.S. § 803:

1. Advantages and disadvantages of generating nuclear energy in this state, including, but not limited to, the economic and environmental impacts;
2. Methods to maximize existing workforce and products made in this state for the construction of nuclear energy generation facilities;
3. Design characteristics, including recommendations for design specifications and site selection;
4. Environmental and ecological impacts;
5. Land and siting criteria, including specific geographic areas that are best suited for new nuclear generation, as well as cities near military bases that may use new nuclear electric generation to meet the military resiliency requirements of 10 U.S.C. § 2920;
6. Safety criteria;
7. Engineering and cost-related information;
8. Small modular nuclear reactor and microreactors capability; and
9. Socioeconomic factors, including, but not limited to:
 - a. workforce education, training, and development;
 - b. local and state tax base;

- c. supply chain capability;
- d. permanent and temporary job creation;
- e. timeline for development, including areas of potential efficiencies, and potential leveraging of existing facilities within this state;
- f. literature review of studies that have assessed the impact of nuclear energy generation; and
- g. policy recommendations to support nuclear energy generation, including a survey of federal programs to financially assist the development of a nuclear project in this state.

In addition to the above questions related to the topics directed by 17 O.S. § 803, Part B of the NOI allowed commentors to identify and provide comment(s) on topics that are not included within the statutory direction but could be related to the question of the feasibility of nuclear energy generation in Oklahoma. Additional topics included the following:

1. What are the appropriate regulatory oversight mechanisms?
 - a. Which Oklahoma agencies are most appropriate to regulate nuclear energy facilities, which may or may not include using existing or new agencies?
 - b. How do other states regulate/oversee nuclear energy generation?
 - c. In other states, how are those regulatory agencies funded (e.g., general appropriations, annual assessment, etc.)?
 - d. What specific areas related to nuclear generation will require state regulatory oversight?
 - e. Which federal agencies regulate nuclear energy facilities, and what is the extent of their oversight authority?
2. Because the Commission is constitutionally charged with ensuring that rates are fair, just, and reasonable, what actions can/should the Commission implement to minimize ratepayer risks associated with investment in nuclear generation?
3. To the extent it is found to be feasible to have nuclear energy generation in Oklahoma, what steps are required, and who would be responsible for coordinating among stakeholders to navigate the processes associated with attracting and developing a nuclear energy ecosystem?
4. What are the advantages and disadvantages for nuclear energy generation in Oklahoma relative to energy diversification, reliability, and/or sustainability?
5. Describe the technical differences between nuclear fission and nuclear fusion, as well as associated public perceptions of each.

Interested persons were invited to submit written comments and to attend a technical conference and a public meeting. The technical conference was held on October 21, 2025, in the Concourse Theater, Suite C50, at the Will Rogers Memorial Office Building. The public meeting was held on January 7, 2026.

In response to the NOI, PUD received several comments from stakeholders, which are detailed in Attachment B.

Public Comments

There were numerous comments filed with the OCC from concerned residents. In summary, most of these concerns related to constant cooling water use, environmental harm due to discharge of heated water into rivers and lakes, high-level radioactive waste, and the perception that nuclear plants are not sustainable, safe, or economically viable.

A public meeting was held on January 7, 2026, at 1:30 p.m. in Concourse Room C50 as stated in the NOI. During this meeting, public comment was taken from 11 commenters. These commenters hailed from several parts of Oklahoma but were predominately from northeastern Oklahoma. Some represented environmental groups from across the state. The groups represented included the L.E.A.D. Agency Inc., Oklahoma Environmental Coalition, Honor the Earth, and Green Country Watchdogs.

In summary, all these commenters were opposed to development of nuclear power in Oklahoma. Reasons for these oppositions included: nuclear waste and its hazards to the environment, including thousands of years of remediation; waste containment and environmental contamination; risks and dangers of a catastrophic event; impacts on human health such as defects; water usage and effects on lakes and streams; costs of construction being overly high compared to other forms of generation, making it not economically viable, and ultimately the costs are borne by Oklahomans; corporate lobbying and data center construction leading to higher bills for consumers, with nuclear adding to these burdens; and endangerment of future generations without their knowledge. Some commenters also reminded the Commission of the need to protect the citizens who opposed nuclear energy in the past and will continue to do so in the future.

Technical Conference Presentations

During the technical conference on October 21, 2025, six presentations were made to the OCC regarding nuclear energy. These presentations are summarized below and included as Attachments C through H of this report.

Nuclear Energy Institute (NEI)

Advanced Nuclear Energy Economics (Attachment C)

The first presentation given during the technical conference, “Advanced Nuclear Energy Economics,” was presented by Marcus Nichol, Executive Director, New Nuclear, for NEI. NEI is

the trade association for the nuclear industry. The presentation started by detailing the economic benefits of nuclear energy in the United States. A map was provided showing the economic contribution by state as researched by Oxford Economics. NEI noted that companies that support nuclear energy migrate to states where there are nuclear reactors. Oklahoma was shown as having \$61 million in economic benefits, even though there are no nuclear reactors in the state. This benefit is from supply chain companies operating in Oklahoma. NEI presented information showing that, when considering total system costs, the lowest-cost energy system for reducing greenhouse gas emissions by 2050 would have a significant portion generated by nuclear energy (43 percent) as compared to a system with 77 percent of energy from wind and solar generators. Research into this comparison was provided by Vibrant Clean Energy.

The NEI identified federal and other funding opportunities for nuclear energy, such as investment tax credits, production tax credits, loan guarantees, deployment assistance for new reactors, and fuel and supply chain grants. The presentation then highlighted economic incentives provided by other states and plans to deploy nuclear reactors all over the United States. These incentives included support for early work, such as Construction Work in Progress (CWIP) cost recovery, state government funds allocated for development, tax incentives for some states, and state funds provided for research and development. The NEI provided slides supporting the statement that “Nuclear appears to be the cheapest scalable, clean energy source by far.”

American Electric Power

Donald C. Cook Nuclear Plant (Attachment D)

The second presentation at the technical conference, “Donald C. Cook Nuclear Plant,” was given by Shane Lies, Executive Vice President, Nuclear Development, for American Electric Power (AEP). He provided an overview of operations at the Donald C. Cook Nuclear Power Plant (Cook), which sits on the shores of Lake Michigan and consists of two units producing approximately 2,300 megawatts (MW) of power. The units became operational in 1975 and 1978, respectively. In 2005, the plant was granted licenses for 20 years of extended operation: until 2034 for Unit 1 and until 2037 for Unit 2. AEP is seeking another 20-year extension, which would extend the total life of this plant to 80 years.

Mr. Lies emphasized that nuclear energy supports a carbon-free generation infrastructure, whether through small modular or utility-scale reactors. The nearly 100 units operated by AEP maintain a capacity factor of nearly 92 percent, demonstrating the technology’s high reliability. The presentation also detailed the layout of the protected areas near the power plant and operational security around the plant. One of the advantages of nuclear generation is energy density. The plant’s owner-controlled area covers approximately 650 acres, while the vital areas represent the generating facility’s actual footprint of approximately 50 acres. In a 50-acre footprint, Cook produces 2,300 MW of power. Nuclear creates the greatest land use benefit when compared to solar (requiring up to 100 times the amount of land) and wind (requiring up to

400 times the amount of land). A chart illustrated how the Cook plant generates electricity using primary, secondary, and condensing systems.

Mr. Lies described the plant's fuel assemblies (each capable of storing up to 4.5 years of fuel) and re-fueling processes. He mentioned that another benefit of nuclear generation is energy security, operating continuously regardless of the weather. Radioactive waste is stored onsite, and AEP plans to store future waste for the extended life of the units. In addition, Mr. Lies explained emergency evacuation plans, which include a 10-mile radius around the plant. One benefit of small modular reactors (SMRs) is that their lower generation rate of radioactive material requires a smaller evacuation area, possibly limited to the site boundary. Additional benefits of SMRs include less construction time, because modular components can be constructed offsite, and smaller initial capital outlays. Compared to the Cook plant, which has multiple systems for safe cooldown, SMRs use passive flow for cooling, which requires no safety-related equipment and simplifies the plant's operation. Most SMR designs are considered walk-away safe and require no critical operator actions to maintain safety.

HDR, Inc., and City of Altus

Air Force Modular Reactor Discussion (Attachment E)

The third presentation of the technical conference, "Air Force Modular Reactor Discussion," was given by Gary Jones, Manager, City of Altus, and Mark Correll, Federal Strategy and Air Force Programs Director, for HDR, Inc. Mr. Jones stated that Altus has a good working relationship with the Air Force base, 92 percent of whose employees live within city limits. Altus has been exploring nuclear energy for the past 2.5 years as an option to provide resiliency to the post and the community. Mr. Jones introduced Mark Correll, who continued the discussion. While not speaking on behalf of the U.S. Air Force (Air Force) or HDR, Mr. Correll provided information about the direction the Air Force and U.S. Army (Army) are headed with SMR programs. The U.S. Department of Defense (DoD) is focused on installation and has designated the Army as the agent of the nuclear programs underway. The Army recently launched the Janus Program to fast-track SMRs for its installations. The Air Force handles nuclear inquiries through their Office of Energy Assurance and is focused on energy resiliency. Nothing is likely to result from their discussions before 2028.

The Air Force's modular reactor initiative focuses on fixed-installation small and micro reactors to provide islandable energy resilience. Reliable, independent power is critical for mission success, particularly in worst-case scenarios where grid connections might be targeted. Modular reactors can help meet this need, and the Air Force is actively trading land for data center development to generate revenue for the required infrastructure. Energy density is a goal for these types of trades, but the primary driver is energy resilience. The Air Force is exploring SMRs up to 75 MW to keep loads within limits required at military bases (not exceeding 75 MW) and might consider partnering with nearby utilities to share in the cost of a larger reactor. For anti-terrorism and force protection, the reactor must be located within site boundaries. The Air Force is prioritizing which bases to consider based on mission criticality. State acceptance is

also a consideration in determining possible sites for new nuclear. The methods will be right of way and a power purchase agreement. The Air Force will not own or operate any nuclear generation but will contract with a utility or separate company.

Lastly, Mr. Correll touched on licensing and permitting statutes.

Occlusion Solutions

Occlusion Nuclear Solutions (Attachment F)

The fourth presentation given during the technical conference was “Occlusion Nuclear Solutions,” presented by Wink Kopczynski with Occlusion Solutions. Mr. Kopczynski opened by stating that Occlusion Solutions has partnered with Deep Isolation and Deep Fission to attempt to merge the oil and gas industry with the nuclear energy industry. Energy demand is outpacing supply as data centers, bitcoin mining, and other large industries require more power. Deep Fission and Occlusion Solutions combined to develop ways to supplement oil and gas, noting that nuclear is the most viable long-term option but that the permitting process and construction costs and timelines are barriers to project feasibility.

Occlusion Solutions proposed drilling a large-diameter hole and installing an SMR 1 mile underground. The hole would be filled with fluid that would be heated, generating steam to produce electricity. This can be done rather cheaply compared to other types of nuclear construction. Mr. Kopczynski estimated subsurface SMR energy costs at 5 to 7 cents per kilowatt-hour and noted that a subsurface SMR would offer greater affordability and safety. One well with an SMR could generate 15 MW of power. Oklahoma drilling resources would be needed for construction. Because of the tools and research required, Occlusion Solutions will be working with Oklahoma industries to build and develop this program.

Occlusion Solutions is also looking into nuclear waste disposal areas. Mr. Kopczynski detailed the global waste burden and the U.S. storage challenge, stating that more than 90,000 metric tons of waste are stored across the United States. Occlusion Nuclear Solutions, in partnership with Deep Isolation, proposes drilling vertically 1 mile with a horizontal lateral of 1 mile in which to store waste canisters. According to nuclear engineers, it would take 1.5 million years for that waste to reach the surface, at which point it would have radioactivity equivalent to that of a banana. One of the problems with nuclear waste and why it is stored onsite is transportation. Occlusion Solutions proposes digging the disposal wells at the site of the nuclear reactor, which also would allow retrieval of the canisters as required. An evaluation of the disposal site’s geological formations would be required first, then the wells would be cased and cemented for permanent installation. This approach combines expertise from both the oil and gas industry and the nuclear energy sector.

After questions by the commissioners, it was determined the SMR borehole could be up to 48 inches in diameter. The horizontal wells could be as much as 25 to 30 inches in diameter, with a 20-inch casing. The horizontal laterals could hold as many as 200 canisters. The Trump Administration has given approval for SMRs to be placed in a well at certain undisclosed

locations. Disposal facilities are subject to regulatory requirements and most likely would be tested internationally first.

Western Farmers Electric Cooperative

Perspective on Nuclear Challenges in Oklahoma (Attachment G)

The fifth technical conference presentation, “Perspective on Nuclear Challenges in Oklahoma,” was given by Justin Soderberg, Vice President, Generation, with Western Farmers Electric Cooperative (WFEC). He started off by introducing WFEC with a map of the service area. Challenges for nuclear in Oklahoma include: the lack of a nuclear base and educational programs, high capital costs, integration with the Southwest Power Pool (SPP) energy market, and public resistance. Currently, Oklahoma has no nuclear facilities, limited nuclear expertise, and no educational institutions offering nuclear programs. Nuclear plants need trained radiological employees and specialized security personnel. Much of the nuclear knowledge that existed in the 1970s and '80s has aged out of the workforce. Colleges and universities offer nuclear engineering and nuclear-related fields primarily in states that already have a nuclear base. The closest nuclear engineering degree programs (BS in nuclear engineering) are at Kansas State University, Missouri University of Science and Technology, and Texas A&M University. In order to build a workforce, the state would need to encourage and incentivize Oklahoma high schools, vocational schools, and universities to offer programs to train needed personnel.

Discussing the high capital costs, Mr. Soderberg detailed the costs of the AP1000 reactors at the Vogtle Power Plant in Georgia. The estimated cost was \$14 billion, and the actual cost was \$35 billion. The NuScale Utah Associated Municipal Power Systems project was proposed at \$3.6 billion for 720 MW of capacity in 2018, and the project was canceled in 2023 after incurring costs of \$9.3 billion, amounting to approximately \$12,916 per kilowatt (kW). Mr. Soderberg described other SMR projects with costs ranging from \$8,000 per kW to \$18,000 per kW. For comparison, the cost for a gas-fired plant is approximately \$2,190 per kW for a 100 MW plant and \$2,150 per kW for a 400 MW plant. He concluded that fossil fuel generation is much more economical than nuclear, and a tremendous number of state and federal subsidies would be needed to mitigate the impact to consumer utility rates. He further noted that cost certainty is an issue because nuclear projects routinely exceed their budgets.

Mr. Soderberg went on to discuss the market fit in Oklahoma, which has an abundance of wind. However, wind energy is highly variable. Nuclear reactors have high capital costs that require baseload operation for a return on investment, which could backfire in a market-based system, nor do nuclear reactors have the capability to fluctuate loads quickly due to the thermal inertia of steam generators.

When discussing public perception, Mr. Soderberg stated that there is still resistance to the idea of nuclear energy. People remember Three Mile Island, Chernobyl, and Fukushima. The public

also worries about environmental issues such as waste disposal and the risk of nuclear materials getting into the wrong hands.

Lastly, Mr. Soderberg provided thoughts on moving forward. He suggested watching the first reactor, or even the first ten, be built and assessing whether the economics improve as more are built. He advocated for watching the technology as it evolves, educating high schoolers about the opportunities for nuclear jobs, developing facilities to train young people, and informing communities about the benefits of nuclear energy and the needs they can fulfill.

Oklahoma Gas and Electric Company

Nuclear Options in Resource Planning (Attachment H)

The final presentation given during the technical conference was “Nuclear Options in Resource Planning,” presented by Kelly Riley, Director of Resource Planning, Oklahoma Gas and Electric Company (OG&E). Ms. Riley started by showing the SPP market mix for nuclear at 5.3 percent from traditional nuclear reactors. Wind makes up 38 percent of the generation mix. Planning for resources includes serving load. Additional considerations about resource requirements include SPP requirements, increasing loads, reliability, environmental regulations, and stewardship, which determine how OG&E defines new resource additions.

As a regulated utility, OG&E prepares an integrated resource plan (IRP) every 3 years, as required by OCC rules [OAC 165:35-37-1 et seq.]. If there is a capacity need, OG&E will issue a broad request for proposals (RFP) covering different types of resources and timelines. OG&E then chooses a proposal and seeks regulatory approval.

Ms. Riley agreed with Mr. Soderberg’s comment that it would be prudent to watch and see how other reactors play out due to risks and uncertainties. While there are many opportunities for nuclear in the state, she also noted the challenges related to technology development, workforce skills, and costs for customers. From a resource planning perspective, in combination with relevant statute requirements, it would be necessary to consider other partnership options, whether federal, state, or corporate. Such support would be required to make the costs competitive while providing reliable service and environmental stewardship.

1.2.2 Legislative History

The Oklahoma State Legislature historically has considered nuclear energy. A summary of previously considered energy legislation is provided below, by bill number.

SB 206 (2024) Oklahoma Department of Environmental Quality (DEQ) Standards for Nuclear Power Plants Synopsis

An Act relating to nuclear energy; directing the Department of Environmental Quality to promulgate rules; authorizing a certain entity to construct a nuclear power plant subject to approval by the Department and the federal Nuclear Regulatory Commission; requiring entity establish secondary facility for certain purpose within certain postal code; requiring certain entity

to submit letter of intent and application to the Department; establishing application contents; providing for codification; and declaring an emergency.

This bill died pursuant to the rules on March 1, 2024.

SB 1535 (2024) Nuclear Inclusive Low Carbon Energy Initiative Synopsis

An act relating to the Oklahoma Low Carbon Energy Initiative; amending 17 O.S. 2021, Sections 802.2 and 802.3, as amended by Sections 1 and 2, Chapter 27, O.S.L. 2022 (17 O.S. Supp. 2023, Sections 802.2 and 802.3), which relate to the duties of the initiative and the Oklahoma Low Carbon Energy Initiative Board membership; modifying duties and membership of the Board; requiring electronic reporting; updating statutory reference; and providing an effective date.

This act was signed by the governor on April 18, 2024. It adds nuclear energy to new energy research and development, and establishes new members for the Low Carbon Energy Initiative Board, which includes the OCC. SB 1370 (2024) also amended this initiative with the inclusion of satisfying equipment needs related to monitoring seismic activity in support of the initiative's goals in Section 802.2 as well as a broadening of the funds allowed to be collected by the Initiative to include "other funding" in Section 802.4.

SB 1674 (2024) Nuclear Energy Facility Standards Synopsis

An act relating to nuclear energy; directing the Department of Environmental Quality to promulgate rules; defining term; authorizing a certain entity to construct a nuclear power plant subject to approval by the Department and the federal Nuclear Regulatory Commission; requiring entity establish secondary facility for certain purpose within certain postal code; requiring certain entity to submit letter of intent and application to the Department; establishing application contents; providing for codification; and declaring an emergency.

There were no standards set or report filed for this. This bill died pursuant to the rules on March 1, 2024.

SB 1712 (2024) Nuclear Energy, Retiring Coal Plants Synopsis

An act relating to nuclear energy; defining terms; requiring certain notice and reporting to the Corporation Commission prior to retirement of a coal-fired electric generation facility; specifying contents of certain report; requiring issuance of final order by the Commission for replacement findings; directing rule promulgation; authorizing a certain entity to construct a nuclear power plant subject to approval by the Department of Environmental Quality and the federal Nuclear Regulatory Commission; requiring entity to establish secondary facility for certain purpose within certain postal code; requiring certain entity to submit letter of intent and application to the Department; establishing application contents; providing for codification; and providing an effective date.

This bill would have required retiring coal plant owners to consider SMRs at retiring coal plants. This bill died pursuant to the rules on March 1, 2024.

SSP1011 (2023) Nuclear Power Plant Capability Study Synopsis

Though this died pursuant to the rules on November 16, 2023, there was an interim study conducted and presented to the Senate Energy and Telecommunications Committee. The interim study is included as Attachment I. This report lists some advantages of nuclear energy and considers the capabilities of the SMRs.

The following are summaries of presentations made to the Senate Energy and Telecommunications Committee during a meeting on nuclear capability for power plants, October 31, 2023, at 1:30 p.m.: Presenters included Marcus Nichol, Executive Director, New Nuclear, Nuclear NEI; Dr. Rita Baranwal, Senior Vice President for Energy Systems, Westinghouse Electric Company, LLC (Westinghouse); Gary Roulet, Chief Executive Officer, WFEC; and Mike Ross, Senior Vice President, External Affairs and Stakeholder Relations, SPP.

Marcus Nichol's (NEI) presentation included the current state of energy in the United States, with nuclear producing approximately 20 percent of the country's energy. Nuclear energy is very reliable, with plants only shutting down for refueling approximately every 1.5 years and operating for up to 60 years with extension services. Most current nuclear plants will seek another extension for up to 80 years of use. Nuclear plants also generate jobs and revenue. Most communities with nuclear facilities are more supportive of nuclear energy than the nation as a whole. Recent polls show that nuclear energy has tremendous support in the United States, including support from environmental groups and bipartisan support, due to its reliability, affordability, and economic benefits. Benefits include that nuclear is environmentally friendly, has black start capability, and can operate independently of the grid. This provides resilience for mission-critical operations and protection from natural disasters, cyber threats, and electromagnetic pulses. While the up-front construction costs of nuclear are high, the operation costs are much lower than for other sources, and the technology is safer.

There are more than 60 designs for nuclear reactors today, all of which aim to improve safety and performance, and some can provide process heat for use in manufacturing processes.

Federal support for nuclear energy includes multiple incentives. The Inflation Reduction Act (IRA) offers a production tax credit of \$30 per megawatt-hour (MWh) for 10 years and investment tax credits of up to 30 percent of project costs, with an additional 10 percent for projects sited in designated energy communities. Both credits can be monetized. There are also loan guarantees for up to \$40 billion and assistance for fuel purchases up to \$700 million. The CHIPS and Science Act also offers financial assistance to states, tribes, local governments, and universities. The NEI has created options to support advanced reactors, including reliability portfolio standards, value-based market/regulatory systems, tax incentives, advanced cost recovery, and workforce and infrastructure support. Mr. Nichol concluded by providing some summaries of actions in other states.

Dr. Rita Baranwal, Westinghouse, presented. She noted that Westinghouse has a global presence and manufactures approximately 50 percent of all nuclear reactors in the world today, with three fuel fabrication facilities. Dr. Baranwal focused on three reactors: the AP1000 (1100+ MW), AP300 (300 MW), and eVinci microreactor (5 MW). Two AP1000 units have been installed in Georgia, with Unit 3 in operation and Unit 4 coming online soon [Unit 4 became operational in April 2024 (GP 2024)]. Added benefits include a minimum refueling cycle of 8 years, transportability, minimal onsite personnel requirements, and remote operability with high-speed load following. The AP300 reactor is a scaled-down version of the AP1000 and the only SMR that incorporates previously licensed and proven technologies.

The AP1000 uses fully passive safety systems and can operate for 72 hours without human intervention after a station blackout. It has been licensed in Europe, China, and the United States. With an availability factor over 92 percent, it provides safe, reliable, and clean energy with load-following capabilities. It needs a small amount of land compared to other nuclear reactors. There are four AP1000 units operating in China, three under contract in Poland, six in India, nine under contract in Ukraine, and two planned in Bulgaria.

The AP300 is based on the AP1000 and requires less than 0.4 acres for safety-related buildings. It uses some of the same technology as the AP1000, including: design and licensing, major equipment and components, passive safety systems, proven fuel, instrumentation and control systems, proven supply chains, constructability lessons learned, modular construction, operations and maintenance procedures and practices, and fast load-following capabilities. The AP300 will be deployable by the 2030s. Some reported problems involved cost overruns at the Vogtle units, primarily due to the need to reestablish supply chains. Westinghouse has re-invigorated its supply chains and continues to leverage its established incumbent supply chains. The AP300 was portrayed as a better risk than the unnamed competitors. Dr. Baranwal highlighted the versatility of the AP300, which can provide steam, process heat for manufacturing, hydrogen, and long-term energy storage, which makes it ideal for desalination plants or district heating.

The eVinci microreactor is envisioned as a nuclear battery able to be transported on a flatbed trailer, rail car, or ship. It can be coupled with other energy sources and offers combined heat and power capability, making it a suitable choice for remote mining operations, industrial process heat, district heating, off-grid communities, hydrogen generation, universities, strategic military installations, critical infrastructure, and research reactors.

Gary Roulet, CEO, WFEC, stated that he has 50 years of experience in operating generation resources. Approximately one-third of the energy produced in their service territory is renewable. The high renewable generation portfolio poses a challenge for dispatching nuclear as a baseload resource. Other fueled units, such as coal plants, are not being dispatched because of the high operating costs. An additional barrier is that several renewable units are planned in the SPP area. Due to these factors, microreactors may be a better solution for Oklahoma. Even a 300 MW unit likely would not be dispatchable. SPP works with former

baseload units cycling on and off to fill the gaps in renewable generation when wind output declines.

Mr. Roulet noted that the skill sets needed for nuclear differ from those required for fossil fuel plants. A nuclear plant may take more operators than a gas- or coal-fired plant, and Oklahoma currently is not developing an appropriately skilled workforce. He stressed the need for developing higher education programs before building any nuclear plants. Another challenge is the ability to build new power plants. WFEC finds that, even when building a small gas-fired plant, that it is difficult to find enough qualified personnel to do so in Oklahoma. WFEC anticipates a long process to change SPP's methods. Mr. Roulet advocated for developing local talent and revising SPP's operational methods rather than waiting to see whether constructing a nuclear plant would be viable. WFEC supports diversified generation but acknowledges that it will take years to implement. Furthermore, raising rates in Oklahoma to pay for a costly resource would not appeal to WFEC's customers.

Mr. Nichol stated that a 500 to 600 MW nuclear plant would require 200 to 300 people but that the number of engineering positions required is relatively small. Most positions would be for maintenance and operations personnel, many of which could be filled by high school graduates.

Mike Ross, SPP, presented on SPP, including board members, committees, operations, balancing authority, regional state committee, reliability coordination, markets, supply generation, and demands. He reported on demand, noting that a peak demand of 56.2 gigawatts (GW) occurred on August 21, 2023, and that the winter peak was 47.2 GW winter. Energy production by fuel type in 2022 was as follows: wind (37.5 percent), coal (33.3 percent), natural gas (20.9 percent), and nuclear (5.1 percent). Mr. Ross noted the daily variability of the energy mix. He pointed out that wind generation has had the lowest costs for an extended period but is extremely variable. Transmission planning must consider reliability, economics, and public policy. Transmission spending was projected to reach \$1.2 billion in 2025 but was under \$400 million in 2024. Congestion causes prices to go up, so transmission lines must be in place to deliver energy from any new plant. Notices to construct have been issued for over \$12 billion in new transmission projects, many in Oklahoma, to move wind energy to other areas. New interconnection requests of approximately 100,000 MW include solar (43.7 percent), wind (21.8 percent), storage (20.1 percent), hybrid storage/renewables (10.7 percent), and gas/thermal (3.6 percent). Mr. Ross detailed savings in the following categories: operations and reliability (\$1 billion), markets (\$2.3 billion), transmission (\$441 million), and tariff, scheduling, and services (\$37.8 million).

Synopsis of SSP1013 and SSP1061, Oklahoma Senate Energy Committee, October 4, 2023:

Though this legislation died pursuant to the rules on November 16, 2023, there was an interim study conducted and presented to the Senate Energy and Telecommunications Committee. The study is included as Attachment J. Marc Nichol from NEI produced the interim study, which

describes the system benefits of advanced reactors, the current energy landscape, the demand for nuclear energy and SMRs, and how nuclear energy can address some challenges and provide a reliable energy source. The report also mentions successes with nuclear energy and social acceptance.

Secretary of Energy and Environment Ken McQueen presented the first few slides of the interim study. Oklahoma has been an oil and gas leader for the last 150 years and has seen diversification of generation in the last 20 years. The United Kingdom signed a memorandum of understanding with Oklahoma allowing an information exchange regarding renewables, and other countries also have expressed interest. Oklahoma exports approximately two-thirds of the energy it produces, primarily oil and gas, and produces approximately 105 percent of the energy it uses. Approximately 5 percent of the surplus energy is exported to the SPP.

Secretary McQueen discussed the three major grids: the Western Interconnection, the Eastern Interconnection, and the Electric Reliability Council of Texas, Inc. These grids do not have alternating current ties and must be self-sufficient. There are only seven direct current tie lines between the Eastern and Western Interconnections, with two ties between the Eastern grid and two ties between the Western grid. Oklahoma is part of the Eastern Interconnection.

Secretary McQueen explained how regional transmission organizations operate and described SPP's role as a balancing authority. SPP drives down costs through economic dispatch, ensuring that generation matches demand. With more renewables, controlling the variability of demand becomes more difficult. He presented statistics of SPP's energy generation mix, of which wind accounts for 52 percent. Oklahoma ranks third in the country for wind energy production and fourth in wind penetration at 44 percent, a level not previously anticipated by experts. In 2022, wind produced more energy than natural gas for the first time, and coal generation dropped to 10 percent. Due to increased restrictions on coal generators and the cleaner operation of gas-fired generators, coal is being phased out. By 2030, coal generation is anticipated to decrease to 116 GW, 36 percent of its peak (318 GW). Nuclear power generation has remained level at 800,000 MWh and could be an option for replacing retiring coal units. While the U.S. Nuclear Regulatory Commission (NRC) has not identified a good solution for waste disposal, which poses a significant challenge to be addressed, it would be worth considering nuclear as a baseload resource solution.

Dr. Steven Biegalski, Georgia Institute of Technology, described some of the reasons for increased nuclear power demand, including an increased demand for carbon-free electricity, as well as successes in the nuclear fleet, new reactor construction, and shifting the public perception of nuclear energy. He discussed the types of nuclear generation available and the options for each. He also addressed nuclear waste management, noting that its volume is often overstated. SMRs can operate for over 8 years without refueling. This period is expected to increase to up to 20 years, further minimizing the amount of waste generation.

Dr. Biegalski attributed the lack of new nuclear plant construction in the last 30 years, other than Vogtle, to a reluctance to be “first” in nuclear energy development, which comes with significant challenges. Parts, the availability of skilled labor, supply chains, and many other factors must be considered, but the Georgia Institute of Technology believes these issues have been resolved. Dr. Biegalski noted Georgia’s incentives and a regulatory structure that allows some of the costs to be recovered from customers as well as the lengthy lifespans of nuclear plants, approximately 60 to 80 years.

Marc Nichol, NEI, presented the same presentation as in SSP1011 (see SSP1011 Nuclear Power Plant Capability Study Synopsis above). He added that spent nuclear fuel is not an unsolvable problem and that relatively small amounts of waste are generated at each individual plant. Mr. Nichol stated that there has never been any harm to humans from a nuclear plant and that nuclear incident rates are similar to those in a regular office building.

Mr. Adam DeMella, Government Affairs, General Electric (GE), described GE’s history with nuclear energy, which began in the 1950s with atomic energy. GE’s designs include the BWRX300 SMR, which was designed to be an appropriate size for siting at retiring coal plants. SMRs are designed to scale down and simplify traditional reactors, resulting in reduced licensing risks and construction costs. Their modular design also reduces man hours, and passive safety features eliminate the need for pumps. GE has one SMR design under contract and due to begin service in 2028. In Poland and Canada, GE will be working on a common design to control costs and operability, with the aim of offering a single design worldwide. According to Mr. DeMella, the current level of interest in this technology is very high, and the company’s objectives are to deliver products that are affordable, on time, and within budget.

Brian Sherry, AEP, presented his input for the Oklahoma Nuclear Power Plant Interim Study, emphasizing the need to focus on capacity and energy. While renewables are a big part of the current energy mix, it is important to incorporate diverse dispatchable baseload options, such as nuclear energy. However, costs and lengthy development and construction schedules can be prohibitive. Other potential dispatchable baseload options include gas plants with carbon dioxide sequestration as well as geothermal and hydroelectric power. Siting reactors near existing infrastructure can reduce costs, and taking advantage of smaller emergency planning zones allows placement closer to population centers, provided that transmission lines are sufficient to deliver energy to load centers. The NEI has put together a list of states proceeding with nuclear energy. The development of a skilled labor force is needed, as nuclear projects create jobs for the state and support domestic production of parts. AEP has not seen any leading technologies become standardized, although establishing standard technology could help reduce construction costs. The retirement of NE Station Unit 3 in 2026 presents an opportunity to use existing interconnection facilities, which could reduce costs; however, permitting and other requirements would still require a 10-year lead time.

Kelly Riley, Director of Resource Planning, OG&E, presented on the need for OG&E and other load-serving entities to provide a certain amount of capacity to SPP. To meet this

objective, her department develops and submits the IRP to the OCC. OG&E supports a diverse generation fleet, aiming for fuel and technology diversity to reduce price volatility. New nuclear technology lifecycle costs are considerably higher than those of other sources, but these are expected to decline as research and development continue. Ms. Riley gave the example of battery storage projects, describing how the costs have come down. If interest in nuclear technologies continues, OG&E will consider them for future planning. Other considerations include tax incentives and IRA tax credits. The current SPP generation interconnection process currently takes at least 5 years, but this period has shortened over time and is expected to continue decreasing.

1.3 A Brief History of Nuclear Power

The Manhattan Project, a top-secret scientific mission to learn how to split the atom to harness its power, was one of the earliest atomic research projects. As part of the project, the first nuclear reactor, known as the Chicago Pile-1, was constructed in 1942 under the stands of Stagg Field at the University of Chicago to demonstrate the power of the atom and self-sustained nuclear fission. On December 2, 1942, a group of scientists led by the physicist Enrico Fermi successfully achieved the first man-made self-sustaining nuclear reaction using the Chicago Pile-1 reactor. This success marked a transformation from nuclear scientific theory into technological reality and the start of the nuclear age. (DOE 2002; UCN 2025)

Congress established the Atomic Energy Commission (AEC) under the Atomic Energy Act (AEA) of 1946 as a civilian body to control nuclear energy development and explore peaceful uses of nuclear energy. The AEC authorized the construction of the Experimental Breeder Reactor-I at the National Reactor Testing Station (forerunner to today's Idaho National Laboratory) near Arco, Idaho. The Experimental Breeder Reactor-I was the first reactor to use nuclear energy to produce electricity. On December 20, 1951, it powered four light bulbs. On December 2, 1957, the first large-scale commercial electricity-generating plant commenced operations in Shippingport, Pennsylvania, supplying electricity to the Pittsburgh, Pennsylvania, area. (DOE 2002) Through the early 1970s, the AEC continued to regulate and promote nuclear power as atomic technology development opportunities opened to the private sector. The Energy Act of 1974 divided AEC functions between two new agencies: the Energy Research and Development Administration, to conduct research and development, and the NRC, to serve as the regulatory authority for nuclear power. The functions of the Energy Research and Development Administration were later transferred to the newly formed U.S. Department of Energy (DOE) in 1977, while the NRC maintains its role as regulator of commercial nuclear power plants and other uses of nuclear materials. (DOE 2002)

Nuclear power is generated by sustained nuclear fission. Nuclear fission is the process of splitting larger atomic nuclei into smaller nuclei, releasing large amounts of energy and neutron particles. The released neutrons sustain the process by causing further splitting of atoms to create a chain reaction. Nuclear reactors are designed to harness this power by arranging uranium in specified spacing, geometry, and concentrations to encourage the fission process in

a controlled manner. This controlled reaction produces heat that boils water to produce steam, which is sent through a turbine to generate electricity (MPSC 2024; UCN 2025)

There have been many reactor designs built, tested, and demonstrated over the years, including gas-cooled reactors, metal-cooled reactors, and molten salt reactors, with the goal of determining the best characteristics for different applications. A key aspect of nuclear power plant design is the choice of coolant used to convey heat from the reactor for use to generate electrical power. The designs of boiling water reactors (BWRs) and pressurized water reactors (PWRs), collectively known as light-water reactors (LWRs), are the most common reactor designs for commercial power. (MPSC 2024)

The BWR design accounts for 31 of the 94 currently operating commercial nuclear reactors in the United States. In a BWR, water coolant in a closed loop boils in the reactor core to produce steam that travels to a steam turbine, causing it to rotate the turbine generator to produce electricity. The steam exiting the turbines is exhausted to the condenser, where it is condensed into water then pumped through a series of condensate and feedwater pumps back to the reactor. Figure 1.3-1 represents a general BWR design. (NRC 2025a)

The PWR design represents 63 of the 94 operating commercial reactors in the United States. In a PWR, the reactor core is pressurized to maintain the heated water coolant as a liquid in the reactor and through the primary coolant system. Pressurized, heated water travels through the primary coolant loop to a steam generator, where heat from the primary coolant loop vaporizes the water in a secondary loop, producing steam. The steam then travels to the steam turbine, where it spins the turbine generator to produce electricity. The steam exiting the turbines is exhausted to the condenser, where it is condensed back into water and then pumped through a series of condensate and feedwater pumps back into the steam generator. The primary difference between PWRs and BWRs is the presence of the secondary cooling loop, including steam generators, in the PWR design. Figure 1.3-2 represents a general PWR design. (NRC 2025b; MPSC 2024)

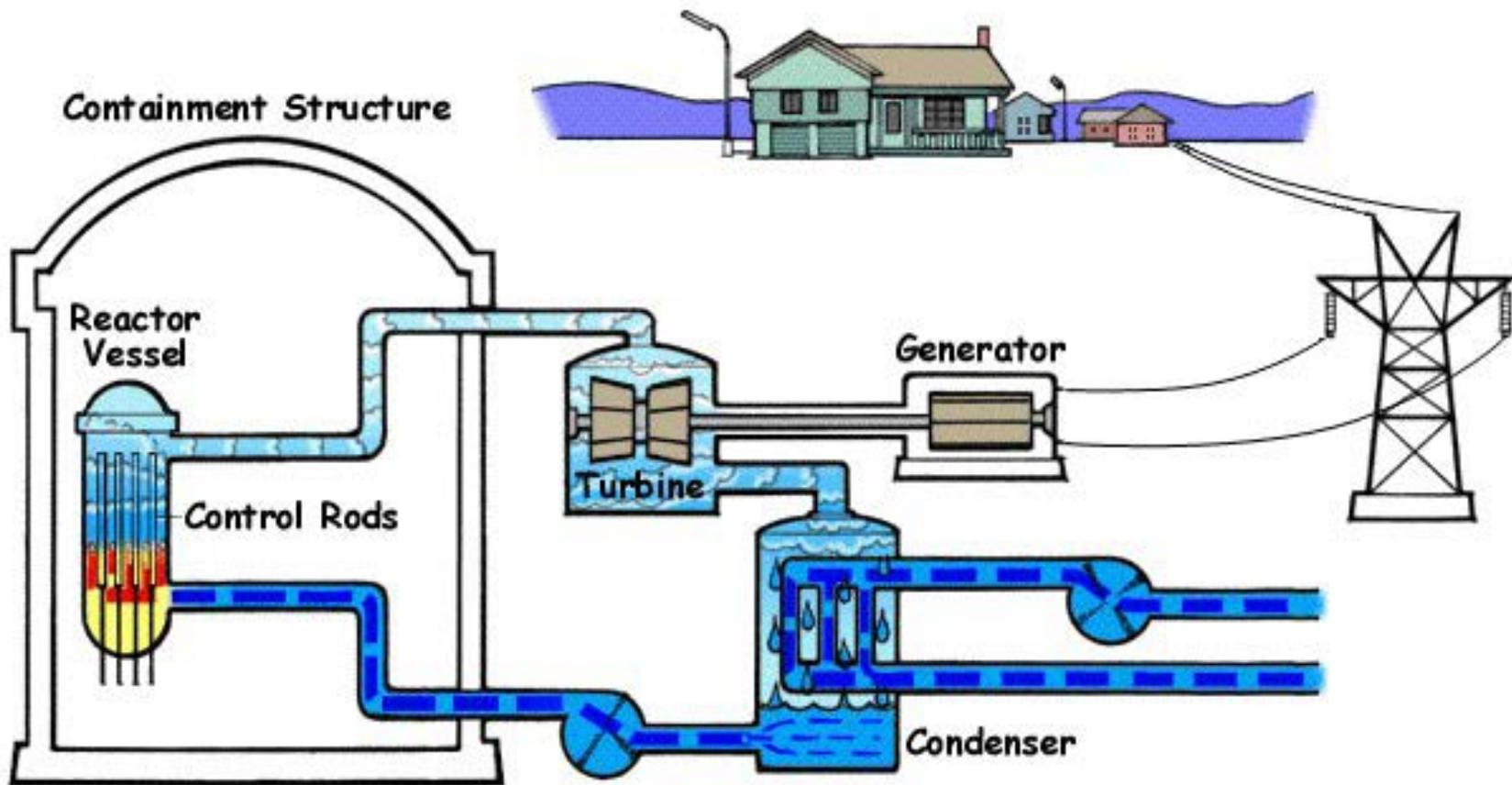


Figure 1.3-1 Boiling Water Reactor

(NRC 2025a)

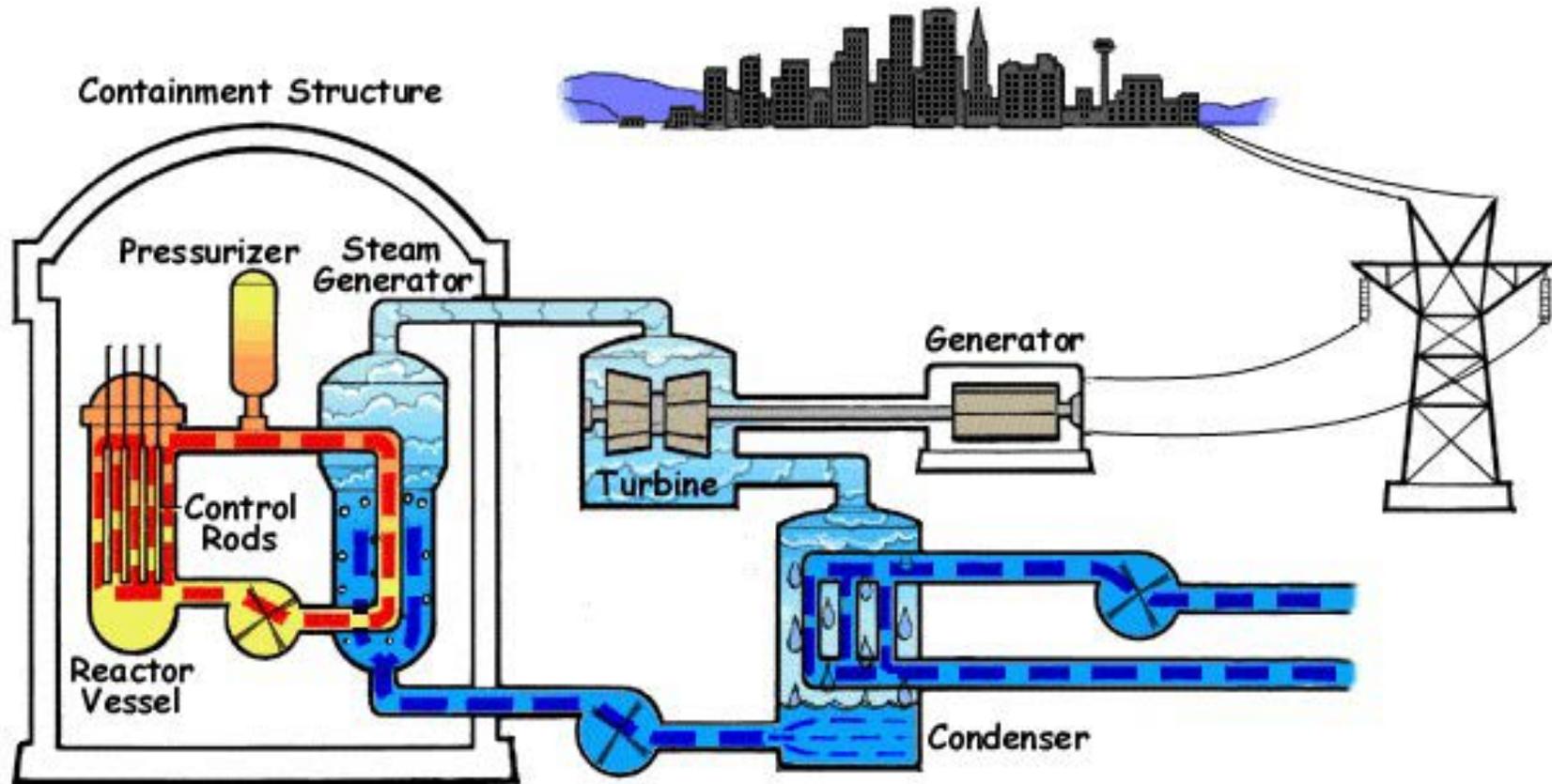


Figure 1.3-2 Pressurized Water Reactor

(NRC 2025b)

1.4 Public Perceptions

The need for secure, stable, and affordable energy continues to grow. Recent global energy disruptions have shown how vulnerable many countries are to supply shocks. Rising electricity demand, especially from artificial intelligence (AI) data centers, is also adding pressure to the system. Addressing these challenges is anticipated to need a comprehensive approach that uses multiple energy sources, including nuclear energy. (IAEA 2022; NEA 2022) States across the United States are exploring whether new nuclear reactors can help meet their energy needs and support long-term economic growth. There is growing bipartisan interest in several states, as many leaders see nuclear energy as a way to meet energy goals while also attracting new industries and creating economic development opportunities. (Young 2023; Paullin 2022; VDOE 2022; OGA 2023; OGT 2023; OGWV 2023; DOE 2024a)

Public views of nuclear energy are dynamic rather than fixed, and several competing factors can either strengthen or weaken public support for nuclear energy. These shifting attitudes reflect a broader set of pressures that shape how people think about nuclear energy. Several forces are pushing public opinion toward greater support: growing global energy insecurity has increased concerns about long-term reliability, fluctuating prices for commodities (including natural gas) continue to strain households and businesses, and ambitious efforts by some states to reduce carbon emissions require the recruitment of stable, secure, and emission-free energy sources. Collectively, these pressures encourage many leaders and residents to view nuclear energy as a valuable part of the overall energy mix. At the same time, the lingering effects of events such as Fukushima still shape public perceptions of nuclear safety and risk, and the unresolved issue of how to manage spent nuclear fuel long-term raises environmental and governance concerns.

This section examines how U.S. residents view the risks and benefits of nuclear energy and how these perceptions influence support for continued reliance on nuclear power. It also considers the potential role of advanced nuclear technologies in meeting future energy needs. The data are drawn from the Energy and Environment (EE) survey series, which is a long-running, Census-balanced national survey developed by the Institute for Public Policy Research and Analysis (IPPRA) at the University of Oklahoma (OU). The survey has been conducted every year since 2006, providing a consistent measure of public attitudes on broad energy and environmental issues as well as specific topics related to the nuclear fuel cycle. The most recent wave of the survey was completed in August 2025 (IPPRA 2025).

The following subsections use IPPRA's EE survey data to: (1) provide an overview of public support for nuclear energy and how that support has changed over time; (2) examine key factors that shape public attitudes, beginning with levels of trust in the actors involved in the nuclear energy system; and (3) describe public perceptions of the risks and benefits associated with nuclear energy. Although the surveys focus on national trends, they also include respondents from Oklahoma, and the subsections highlight perspectives from Oklahomans on each core topic.

1.4.1 Public Support for Nuclear Energy

Public support for nuclear energy in the United States has shifted over time for several reasons. In the 1970s, support was relatively high and remained stable until the Three Mile Island incident in 1979, which led to a significant decline. The Chernobyl and Fukushima accidents produced similar drops in support. At the same time, concerns about energy security have contributed to periods of renewed interest in nuclear energy in the recent past (Gupta et al. 2019).

IPPRA's EE survey series began tracking attitudes about nuclear energy in 2006. Two core questions in every survey ask respondents to indicate how strongly they support or oppose constructing new nuclear reactors (1) at existing sites and (2) at entirely new locations. In 2022, the survey was expanded to include a third core question that measures support for the construction of advanced nuclear reactors. These core questions have allowed for the systematic tracking of public support for nuclear energy over the last 2 decades, both across the country and within key subgroups, such as regions and specific populations.

Figure 1.4-1 uses these core questions as a framework to show how public support for nuclear energy has changed over time and how attitudes differ between support for new reactors at existing sites, new plants at new locations, and advanced nuclear technologies. In the EE survey, the deployment of traditional LWR technology is assumed when asking the public about new reactors at existing sites and new plants at new locations. As Figure 1.4-1 indicates, U.S. public support for traditional nuclear energy technology was relatively high from 2006 through 2010 but declined sharply after the 2011 Tohoku earthquake and the Fukushima Daiichi nuclear power plant accident in Japan. Before Fukushima, more than 50 percent of respondents who held opinions about nuclear energy supported constructing new nuclear reactors, both at existing sites and at new locations. After the accident, support for building reactors at either type of site dropped below 50 percent and remained at that level for nearly a decade. The data show a gradual recovery beginning in 2021, which marked the first time in 10 years that more than 50 percent of respondents expressed support for constructing new reactors and new nuclear plants in the United States.

Figure 1.4-1 also indicates that support has varied across the three types of nuclear technology categories measured in the survey: new reactors at existing sites, new nuclear power plants at new locations, and advanced nuclear reactors, sometimes called Generation IV (Gen IV) nuclear reactors. Support for constructing new reactors at existing sites has generally been slightly higher than support for building entirely new plants, although both followed a similar pattern of decline after the Fukushima accident and gradual recovery in recent years. Support for advanced nuclear reactors, which has been measured since 2022, has consistently been higher than support for the two traditional options. This pattern suggests that, while public views on traditional nuclear technologies have been shaped by past accidents and long-standing concerns, advanced reactors may benefit from the perception that they offer improved safety and performance.

While the Oklahoma sample sizes are too small to show year-to-year trends for each measure, pooling responses across the last four survey waves (2022–2025) provides a more reliable picture. When the data are combined in this way, support among Oklahoma respondents for new reactors at existing sites, new nuclear plants at new locations, and advanced nuclear reactors is broadly consistent with support among national respondents. For example, during this period, support among national respondents for these three options was 60 percent, 55 percent, and 68 percent, respectively. Among Oklahoma respondents, the corresponding levels of support were 62 percent, 57 percent, and 66 percent.

1.4.2 Risk and Benefit Perceptions

Broad national events and long-term trends play an important role in shaping public opinion about nuclear energy. However, just as important are the variations in individual perspectives. Understanding why one person supports nuclear energy while another opposes it requires attention to the perceptions and beliefs that people draw upon when forming their opinions. Research in this area consistently shows that individuals rely on their perceptions of risks and benefits when evaluating nuclear energy (De Groot et al. 2012; Ho et al. 2019; Slovic et al. 1982; Whitfield et al. 2009). Perceived risks often stem from concerns about nuclear weapons, reactor accidents, terrorism, and the potential release of radiation during the transportation and storage of spent nuclear fuel (Slovic 1996; Keller et al. 2012; Parkhill et al. 2009; Gupta et al. 2024). Perceived benefits, on the other hand, reflect beliefs that nuclear energy can strengthen energy independence, provide reliable power, reduce greenhouse gas emissions, and lessen reliance on fossil fuel extraction (De Groot and Steg 2010; Kim et al. 2014).

Individuals who view nuclear energy as dangerous and of little value tend to oppose it, while those who believe it is safe and beneficial are generally supportive. In practice, people weigh these often-competing perceptions of risk and benefit when forming their views, and the balance between them plays a central role in shaping support for or opposition to nuclear energy.

To capture and study these dynamics, IPPRA's EE survey series includes a set of questions that measure how individuals perceive the risks and benefits of nuclear energy. Respondents are asked about four potential risks (accidents at a nuclear plant, accidents during transportation or storage of spent nuclear fuel, terrorist attacks, and nuclear proliferation) and four potential benefits (reduced greenhouse gas emissions, reliable power generation, greater energy independence, and less environmental damage).

Since 2006, perceptions of both risks and benefits have been relatively stable. Average ratings for each risk have consistently remained above the midpoint on the scale. Across all years, terrorist attacks and accidents at power plants or during the storage and transportation of spent nuclear fuel are viewed as the greatest risks, while concerns about nuclear proliferation are lower but still above the midpoint. Perceived benefits show a similar pattern. Average ratings for all four benefits remain above the midpoint on the scale. Energy independence and reliable power generation are consistently viewed as the most important benefits, while reduced

greenhouse gas emissions and environmental protection rank somewhat lower, though still well above the midpoint.

The relationship between these two dimensions can be examined by placing respondents' perceptions on a two-by-two matrix of perceived risks and perceived benefits. For this analysis, each respondent's average risk score and average benefit score are calculated using the components described above, and these scores are then plotted against one another. The resulting matrix provides a picture of how people balance the two dimensions.

In 2025, most respondents (50 percent) fell into the "high risk, high benefit" quadrant, indicating that they saw nuclear energy as both risky and valuable. The second-largest group (29 percent) viewed nuclear energy as relatively low risk (scores of 5 or lower) but high benefit (scores above 5). A smaller share (14 percent) held the opposite view, seeing nuclear energy as high risk but low benefit. The smallest group (8 percent) fell into the "low risk, low benefit" quadrant and viewed nuclear energy as both a low-risk and low-benefit energy source.

As shown in Figure 1.4-2, these proportions have remained relatively stable since 2006, although small year-to-year shifts occur. Notably, the share of respondents in the "low risk, high benefit" quadrant has increased in recent years, rising from 21 percent in 2023 to 29 percent in 2025.

Again, the data are too sparse in Oklahoma to provide a reliable comparison for 2025 alone, but pooling responses across the last four survey waves (2022–2025) allows for a meaningful comparison. When combined in this way, the distribution of Oklahoma respondents across the four risk-benefit quadrants closely matches the national distribution. During this period, 60 percent of Oklahomans fell into the "high risk, high benefit" quadrant, compared to 53 percent nationally. In the next most populated quadrant, "low risk, high benefit," 22 percent of Oklahomans fell into this category, compared to 24 percent of respondents nationally.

These results illustrate the practical challenge many people face when weighing risk and benefit perceptions. Individuals often see nuclear energy as both risky and valuable, and they must reconcile these competing evaluations when forming their views. One way to study this reconciliation is to estimate statistical models that examine how perceived risks, perceived benefits, and other individual-level factors work together to shape overall support for nuclear energy. Models of this sort allow researchers to assess not only the overall tradeoffs people make between risks and benefits but also which specific risk and benefit perceptions are most influential in shaping public support.

In these models, two types of perceived risks stand out as the strongest predictors. The most important is the concern about a major accident that releases large amounts of radiation. Nearly as important is the concern about accidents during the transportation or temporary storage of spent nuclear fuel. Other risk perceptions, such as fears about the diversion of spent fuel for

weapons development or terrorist attacks on nuclear facilities, are much less influential in shaping overall views.

On the benefit side, the most powerful predictor of support is the belief that nuclear energy provides reliable electricity that is not affected by time of day or weather conditions. Energy independence is the next most important benefit. By contrast, the climate and environmental benefits of nuclear energy are less influential. When evaluated alongside other risks and benefits, they have little or no effect on public opinion. Together, these findings suggest that growing concerns about grid reliability and global energy insecurity are likely to increase support for nuclear energy, while environmental considerations alone are unlikely to drive major shifts in public attitudes. This pattern is especially evident in states like Oklahoma, where reliability and energy security concerns routinely rank among the public's highest energy priorities.

1.4.3 Trust in Key Actors

While perceptions of risks and benefits play a central role in shaping views about nuclear energy, they do not fully explain why people support or oppose it. In a domain where public awareness is limited and technologies are complex, individuals often rely on trusted actors to help interpret information and make sense of potential tradeoffs (Greenberg 2009; Siegrist 2000; Visschers et al. 2011). This reliance is made more challenging by an increasingly crowded and confusing information landscape, where it can be difficult to find, filter, and evaluate reliable sources (Glik 2007; Siegrist and Cvetkovich 2000; Slovic 2012). Many different actors operate within the nuclear policy subsystem—federal agencies, industry groups, independent scientists, environmental organizations, and state and local officials—and each communicates with communities in different ways and with varying levels of credibility. Understanding how much people trust these actors is therefore essential, because trust shapes how receptive individuals are to information, how they interpret claims about risks and benefits, and, ultimately, whether they support or oppose nuclear energy.

Given the importance of trust, the IPPRA's EE survey series includes multiple items designed to measure trust, both over time and across actors. One core question asks respondents to evaluate the level of trust they place in experts who provide information about nuclear energy and spent nuclear fuel. Respondents provide their ratings on a scale from 0 to 10, where 0 indicates no trust and 10 indicates complete trust.

As shown in Figure 1.4-3, the ordering of actors that the public trusts most has remained remarkably consistent over time. University scientists and the National Academy of Sciences sit at the top of the list, reflecting strong confidence in independent scientific expertise. They are followed closely by the NRC, the U.S. Environmental Protection Agency (EPA), and the national laboratories for energy and security, all of which maintain relatively high and stable levels of trust. Mid-tier actors include state and local emergency response agencies, the DOE, environmental advocacy groups, and state regulatory agencies. Advocacy groups that support or oppose nuclear energy fall lower in the ranking, along with utilities. The least trusted sources

throughout the period are state and local news media and national news media, which receive the lowest trust ratings year after year. Despite year-to-year fluctuations, this general ordering has changed little since 2017.

Overall, trust in the actors involved in nuclear energy showed modest variation over the full period, but the patterns were largely stable. The most notable change occurred between 2024 and 2025, when trust for nearly every actor declined noticeably. During that same year, public support for nuclear energy also fell, as shown in Figure 1.4-1. While the data cannot confirm a direct causal link, the parallel declines in trust and support during this period suggest that reduced confidence in key institutions may have contributed to the drop in support for nuclear energy.

As with the previous two sections, the data are too sparse in Oklahoma to provide a reliable comparison for 2025 alone or for changes between 2024 and 2025. Pooling responses across the last four survey waves (2022–2025), however, allows for a meaningful comparison of trust in key actors. Looking at the pooled data, Oklahomans trust the same actors in roughly the same order as respondents nationwide. University scientists and the National Academy of Sciences receive the highest trust, followed by federal regulatory agencies and national laboratories. Advocacy groups and news media fall to the bottom of the list, just as they do nationally. Despite this similar ordering, Oklahomans tend to report lower levels of trust across all actors, suggesting a generally lower baseline of confidence in information about nuclear energy from all actors compared to the national sample.

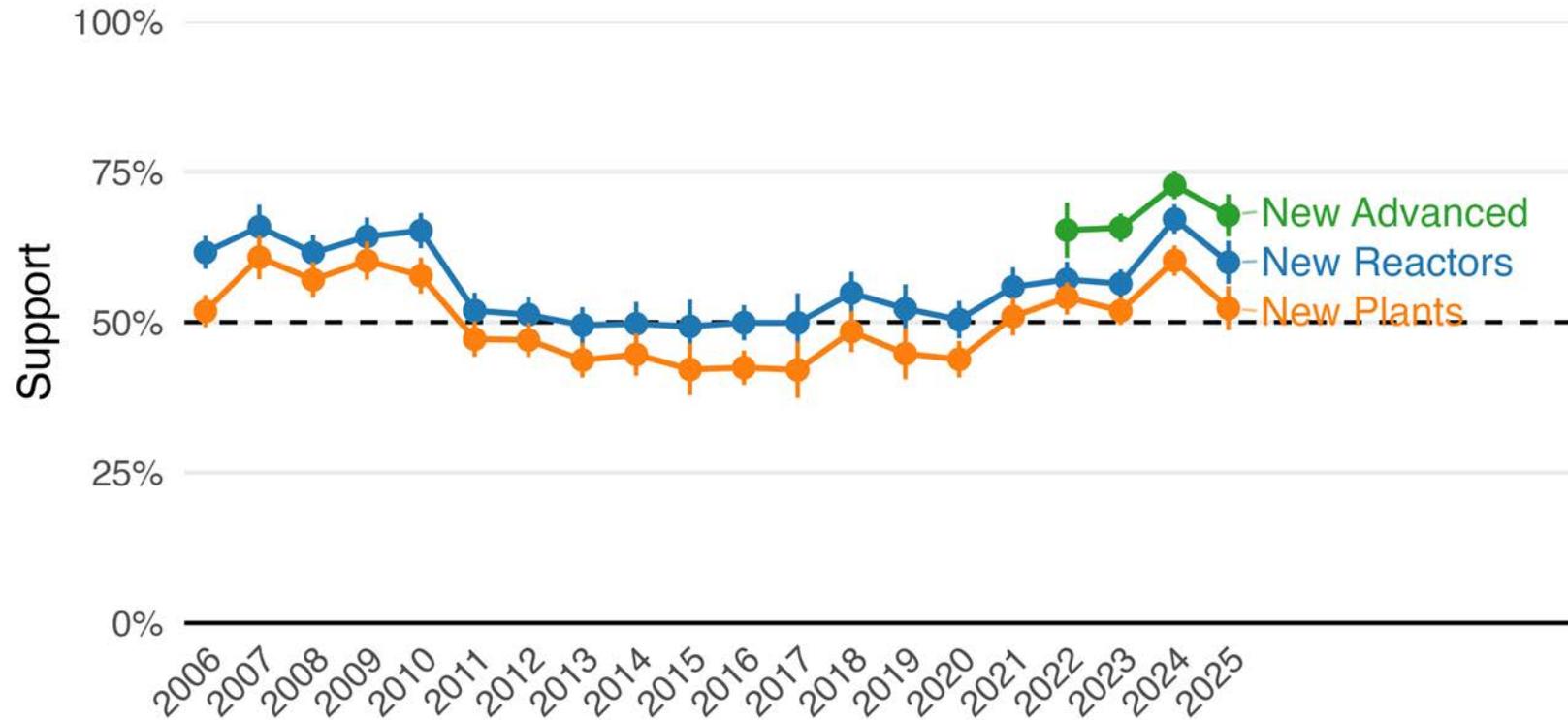


Figure 1.4-1 Support for New Reactors, New Plants, and Advanced Reactors in the United States, 2006–2025

(IPPRA 2025)

Note: “New Reactors” represent the deployment of existing LWR technology at existing nuclear sites, and “New Plants” represent the deployment of existing LWR technology at existing non-nuclear sites. “New Advanced” represents the deployment of these reactor types at existing nuclear and non-nuclear sites.

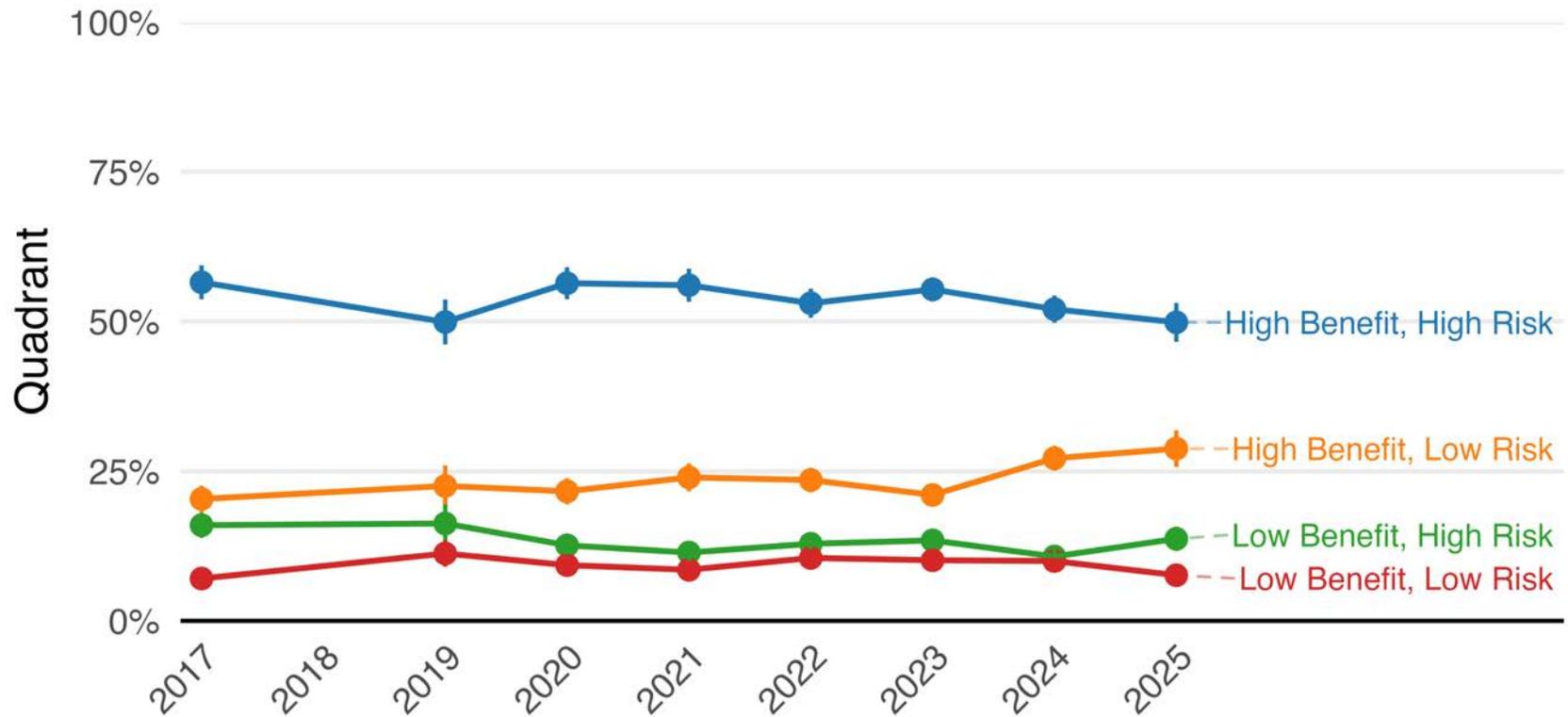


Figure 1.4-2 Public Perceptions of Nuclear Energy Mapped Across Risk-Benefit Quadrants, 2017–2025

(IPPRA 2025)

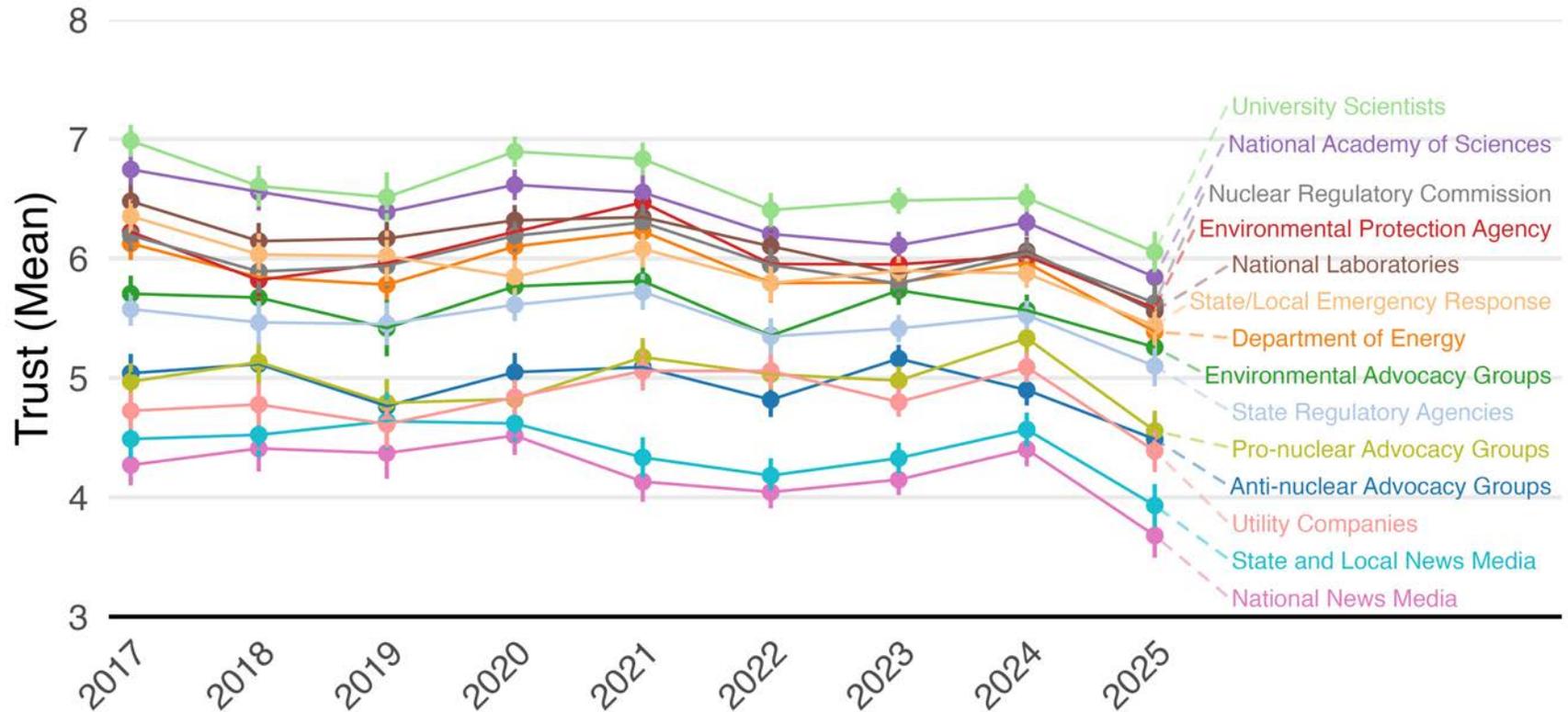


Figure 1.4-3 Public Trust in Key Actors Involved in Nuclear Energy, 2017–2025

(IPPRA 2025)

1.5 U.S. Nuclear Energy Advancement Strategy

The U.S. Nuclear Energy Advancement Strategy aims to expand nuclear energy capacity in the United States by providing a framework for the federal Executive Branch to support nuclear development through coordinating federal regulatory agencies, setting specific goals for advancement, prioritizing funding, and providing guidance for both public and private action. The strategy outlines goals for future nuclear development, which include 35 GW of new nuclear energy capacity by 2035, a sustained build rate of 15 GW per year by 2040, and 200 GW of new nuclear capacity by 2050. Additional benefits include, but are not limited to, energy reliability and security and economic and industrial leadership. The U.S. Nuclear Energy Advancement Strategy is supported by several significant acts and executive orders, as detailed below.

1.5.1 Fiscal Responsibility Act

The Fiscal Responsibility Act of 2023 (FRA) included permitting reforms specifically relating to environmental review, which may benefit the nuclear power industry by reducing environmental review timelines and clarifying the requirements for complex infrastructure and advance reactor licensing. The portion of the FRA that most directly affects nuclear licensing is Section 321, known as the Builder Act, which includes amendments to the National Environmental Policy Act (NEPA). NEPA reviews are a requirement for licensing new nuclear reactors and major nuclear-related projects through the NRC. The changes to NEPA set specific deadlines and page limitations for environmental reviews while clarifying roles and procedures for regulatory agencies and project sponsors in preparing NEPA-based documentation. Additionally, the FRA improves the efficiency of regulatory reviews by allowing the use of other agencies' publicly available information, programmatic environmental documents, and streamlined review processes.

1.5.2 ADVANCE Act

The Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act of 2024 is a federal law designed to streamline licensing, promote innovation, and reduce regulatory barriers for advanced nuclear technologies. It requires the NRC to implement modernized procedures to improve the efficiency and predictability of the nuclear licensing process while expediting the review process for qualifying new reactor license applications. The ADVANCE Act also directs the NRC to create risk-informed strategies and guidance tailored to advanced designs and microreactors. This act also includes a financial component that allows for the reduction of licensing costs by adjusting the NRC fee structure and allowing for rewards to incentivize first-of-a-kind (FOAK) reactor deployments and certain fuel milestones. In addition to the regulatory and financial incentives in the ADVANCE Act, an environmental component encourages simplified licensing at brownfield and retired fossil fuel sites as a way to repurpose existing infrastructure.

1.5.3 Executive Orders

Executive Order 14299 – Deploying Advanced Nuclear Technologies for National Security

Executive Order 14299 directs the deployment of advanced nuclear reactor technologies, including SMRs, microreactors, and next-generation designs, for defense and national security energy resilience. The primary purpose of this order is to provide reliable power to critical facilities while advancing both civilian and defense energy priorities.

Executive Order 14300 – Ordering the Reform of the Nuclear Regulatory Commission

Executive Order 14300 aims to expedite the nuclear licensing process and support the deployment of new nuclear reactors. The order sets federal policy goals to support the widespread expansion of nuclear power capacity in the United States while maintaining both safety and deployment goals as NRC objectives.

Executive Order 14301 – Reforming Nuclear Reactor Testing at the Department of Energy

Executive Order 14301 provides direction to the DOE for modernizing the reactor testing process. The directive establishes pilot programs and supports a more efficient transition from research to deployment.

Executive Order 14302 – Reinvigorating the Nuclear Industrial Base

Executive Order 14302 focuses primarily on the development and expansion of domestic supply chains and the nuclear workforce. The domestic supply chains described in this order include uranium production, enrichment, and fuel fabrication. This act aims to strengthen the full nuclear industrial complex by supporting nuclear restarts, improving supply security, and developing workforce education programs.

2.0 NUCLEAR TECHNOLOGY, SITING, AND LICENSING

2.1 Nuclear Plant Designs and Timeline for Development

This section provides an overview of the advanced nuclear reactor designs being developed and the proposed timelines. The section is divided into four main subsections: advanced large LWRs, light-water SMRs, non-LWRs, and nuclear project timelines. Because there are many ways to group the advanced reactor types, this study groups reactor types either by electrical power size or as LWRs rather than non-LWRs.

Nuclear power plant designs are often categorized by generations. Generation I includes reactor and power plant designs developed as early prototypes in the 1950s and 1960s. Generation II reactors, which feature increased power output, represent a majority of the current U.S. commercial nuclear power fleet and are either PWR or BWR LWR designs. Generation III/III+

(Gen III/III+) reactors were introduced in the late 1990s with increased efficiency and additional enhanced safety features (primarily passive safety features based on reliable physical phenomena, such as gravity and density differences). (WNA 2025) The most notable Gen III/III+ nuclear power project is Plant Vogtle in Waynesboro, Georgia, which features two Westinghouse AP1000 units. Gen IV reactors differ from LWRs in several ways, with the main differences being that the Gen IV reactors use different coolants and fuel forms than LWRs to achieve higher thermal efficiencies and fuel-cycle benefits. (GIF 2025) The following discussions will focus on the Gen III+ and Gen IV reactors.

2.1.1 Advanced Large Light-Water Reactors

Advanced large LWRs are essentially an evolutionary development of the current fleet of PWR and BWR reactors in that they have enhanced safety features, longer operational life expectancy, and greater efficiency (NIA 2025). These are known as Gen III or III+ reactors, with the most notable and proven design being the Westinghouse AP1000 PWR. The AP1000 is a two-loop PWR with a nominal net electrical output of 1,200 megawatts electric (MWe). Units 3 and 4 at Plant Vogtle in Georgia are the first new commercial nuclear reactors to be built in the United States in roughly 30 years (excluding the 2016 completion of Watts Bar Unit 2, for which construction began in the mid-1970s). There are several applicants currently pursuing the licensing of more AP1000 units to support expected energy demands. (Westinghouse 2025a)

A key attribute of the AP1000 design, other than being based on proven PWR technology, is its unique ability to use natural circulation, gravity, and convection to ensure safety functions during postulated accident events considered as part of the plant design. Following a station blackout, the AP1000 can safely function for at least 72 hours without offsite power or operator action, known as a coping period. During this period, the system remains safe and cool, thus providing enough time to deliver additional water and resources to sustain the plant indefinitely. See Figure 2.1-1 for an overview of the plant passive containment cooling system. (Westinghouse 2025b)

2.1.2 Light-Water Small Modular Reactors

The light-water SMRs are also based on the same LWR technology as the AP1000 but generally are capped at an electrical output of 300 MWe (arbitrarily selected). Currently in the design phase, these reactors will leverage many of the proven systems from designs such as the AP1000 but on a smaller scale. There currently are four main U.S. reactor design development projects within this category: the GE-Hitachi BWRX-300, the Westinghouse AP300™, the NuScale Power Corp. NuScale Power Module™, and the Holtec SMR-300™ (NEA 2025). An overview of each design is provided in Figure 2.1-2.

2.1.3 Non-Light-Water Reactors

The Generation IV International Forum refers to non-LWRs as Gen IV nuclear reactors. This forum created a road map for developing these reactors, which are categorized into six reactor types: sodium-cooled fast reactor, lead-cooled fast reactor, very-high-temperature gas-cooled reactor, gas-cooled fast reactor, supercritical water-cooled reactor, and molten salt reactor. A generic description of each is provided in Figures 2.1-3 through 2.1-8.

The reactors vary in electrical power size from microreactors (1–20 MW) up to 1,000+ MW nuclear power plants. Gen IV reactors differ from LWRs in that they use different primary coolants, as shown in Figures 2.1-3 through 2.1-8. The primary coolant of a reactor is fluid that is directly heated by the nuclear fuel. The combination of nuclear fuel type and primary coolant serves as a general benchmark in classifying different reactor types or families. In addition to using different coolants, Gen IV reactors are designed for the use of greater uranium enrichment levels than used by the current fleet, which is low-enriched uranium (generally a 3- to 5-percent concentration of U-235). The advantages of using higher enrichment levels include the use of new fuel types, new operational modes, and greater energy production per unit volume, potentially allowing for longer periods between fueling outages. (NEA 2025) Thus, with many variations in fuel types, coolants, electrical sizes, and a variety of other design characteristics, there is a wide range of possible reactor combinations. Due to these variations, there are currently over 120 different reactor vendors around the world in various stages of design, as shown in Figure 2.1-9.

The Nuclear Energy Agency (NEA) identified several of the main reactor vendors for the different Gen IV concepts and created a comparative table listing the characteristics of each design, as shown in Figures 2.1-10 through 2.1-13. These reactors are at different stages of development, including design, funding, demonstration, and regulatory approval. Each concept has its advantages and disadvantages, which need to be researched further to determine viability.

2.1.4 Nuclear Project Timelines

Projecting nuclear power plant construction timelines is challenging as the only new units built in the United States over the last 30 years are the two AP1000 units at Plant Vogtle, as discussed previously. Thus, all upcoming designs, other than the Westinghouse AP1000, will be FOAK projects. The Gen IV reactors could face even more challenges upon start-up as there is little to no previous operating experience to leverage. Figure 2.1-14 is based on a 2023 DOE report and depicts an estimated timeline for building a large Gen III/III+ design nuclear power plant (DOE 2023; MPSC 2024). The timelines for SMRs, microreactors, and Gen IV reactors can vary considerably. However, timeline estimates provide a basis for developing a plan, which typically includes a feasibility study, regulatory approval, design, procuring equipment, and finally construction and start-up. It should be noted, however, that the DOE timeline was created prior to the 2025 Executive Orders issued to reduce the length of nuclear development timelines.

Additionally, three notable DoD programs could help promote several vendor selections, including the Strategic Capabilities Office's Project Pele, the Air Force microreactor pilot, and the Advanced Nuclear Power for Installations program, led by a coalition including the Defense Innovation Unit, Army, and Air Force. The Strategic Capabilities Office began Project Pele in 2016 to design, build, and demonstrate a prototype mobile nuclear reactor for military installations. This program selected the vendor BWX Technologies (BWXT) with a demonstration at Idaho National Laboratory planned for 2028. (SCO 2025) The Air Force selected the vendor Oklo for its microreactor pilot at Eielson Air Force Base in Fairbanks, Alaska, and is targeting operations in 2027 (DAF 2025). The Advanced Nuclear Power for Installations program has named eight reactor vendors for installations on DoD military locations: Antares Nuclear, BWXT, General Atomics, Kairos Power, Oklo, Radiant Industries Incorporated, Westinghouse Government Services, and X-Energy, LLC (DIU 2025).

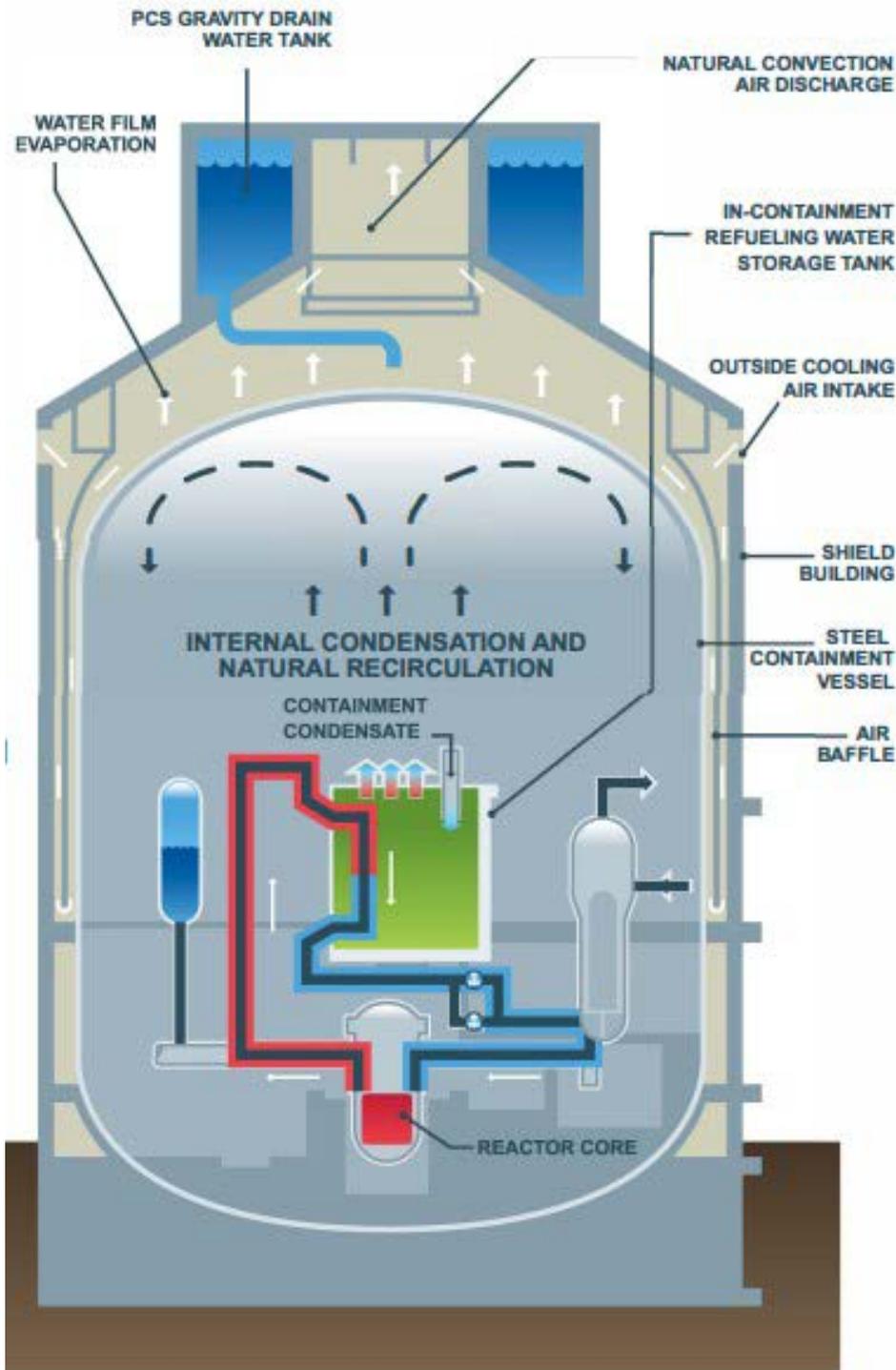


Figure 2.1-1 Westinghouse AP1000

(Westinghouse 2025b)

	BWRX-300 GE-Hitachi	AP300™ Westinghouse	NuScale Power Module™ NuScale Power Corp.	SMR-300™ Holtec
FUNCTION	Flexible Electricity, Hydrogen Production, Desalination, Black start capability, District Heating	Flexible Electricity, Hydrogen Production, Desalination, Black start capability	Flexible Electricity, Hydrogen Production, Desalination, Black start capability	Flexible Electricity, Hydrogen Production, Desalination, Black start capability
NEUTRON SPECTRUM	Thermal	Thermal	Thermal	Thermal
MODERATOR	H2O	H2O	H2O	H2O
HEAT TRANSFER MECHANISM	H2O	H2O	H2O	H2O
OUTLET TEMP	287 °C	~300°C	314 °C	316 °C
FUEL				
Enrichment	LEU	LEU	LEU	LEU
Fuel Form	Ceramic UO2 Pellets	Ceramic UO2 Pellets	Ceramic UO2 Pellets	Ceramic UO2 Pellets
Refueling Period/Method	12-24 months	12-24 months	18 months	18 months
POWER OUTPUT				
Classification	LWR-SMR	LWR-SMR	LWR-SMR	LWR-SMR
Base Model Output (MWe)	300 MWe	300 MWe	77 MWe	300 MWe
Plant Scalability Output (MWe)	TBD	Unknown	924 MWe (77 MWe x12) 462 MWe (77 MWe x 6) 308 MWe (77 MWe x 4)	TBD
REGULATORY PROGRESS				
Government Support			\$578 million to date in cost-shared financial assistance awards	
NRC Status	Preapplication engagement; construction permit application submitted May 2025	Preapplication engagement; design certification anticipated by 2027	77 MWe standard design approval for NuScale Module approved in May 2025	Preapplication Engagement
CNSC Status	Construction license issued April 2025	Unknown	Not publicly available	Unknown
Deployment Expected	Darlington (Canada) Site: 2030 Clinch River (USA) Site: 2032	Not publicly available	Early 2030s	Palisades, USNRC LWA Application expected Q1.2026

Figure 2.1-2 Small Modular Reactor Specifications

(NIA 2025)

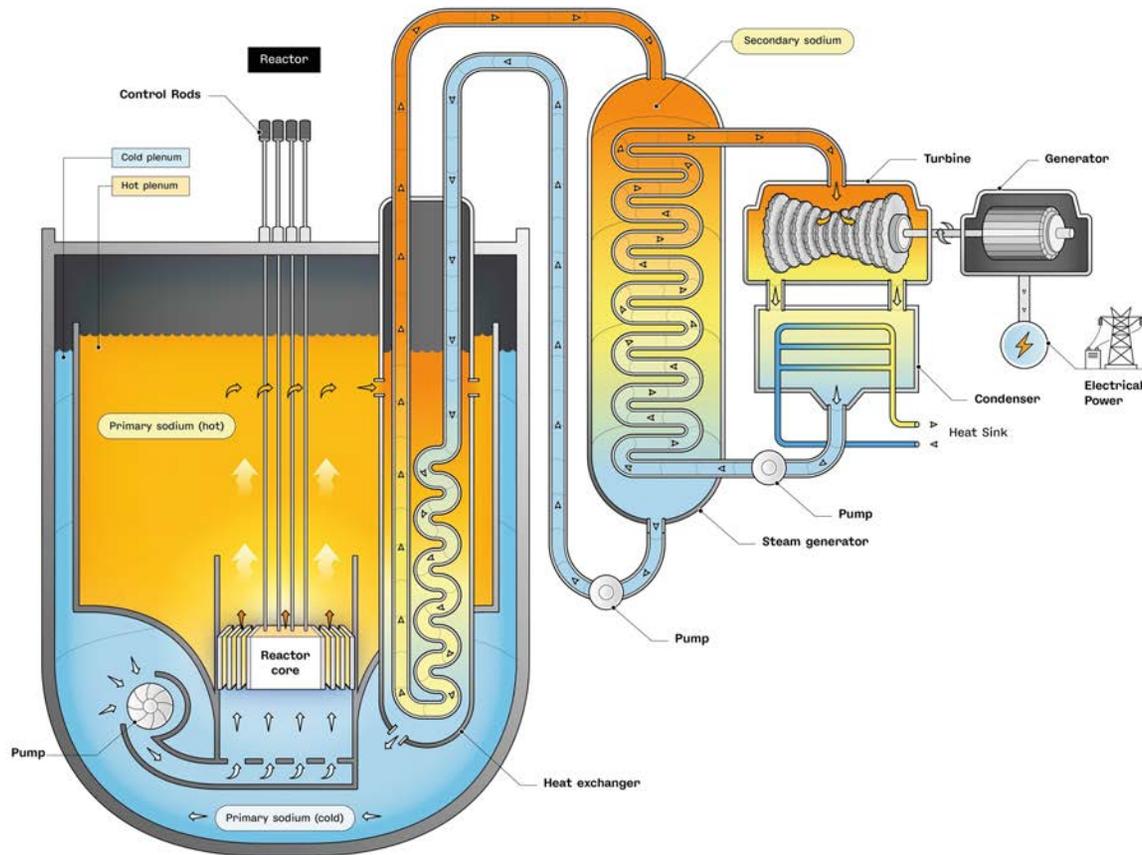


Figure 2.1-3 Sodium-Cooled Fast Reactor Diagram

(GIF 2025)

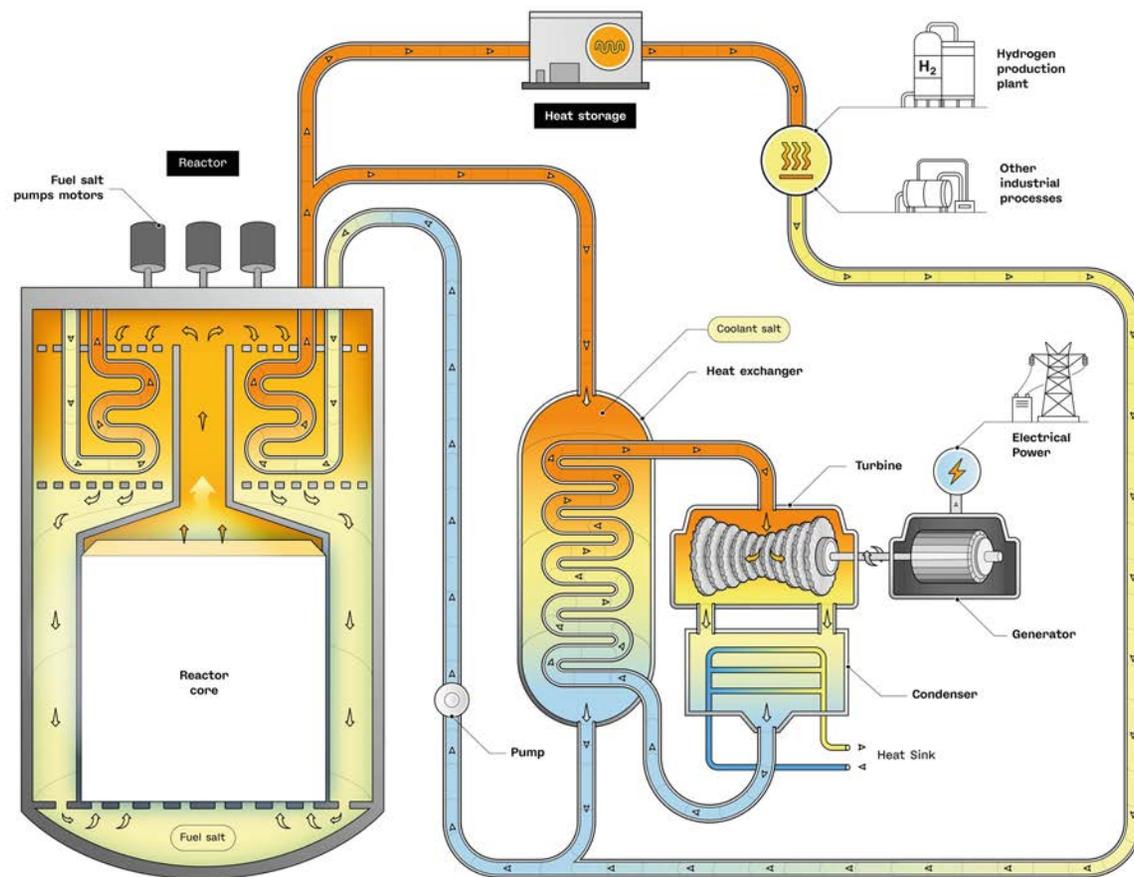


Figure 2.1-4 Molten Salt Reactor Diagram

(GIF 2025)

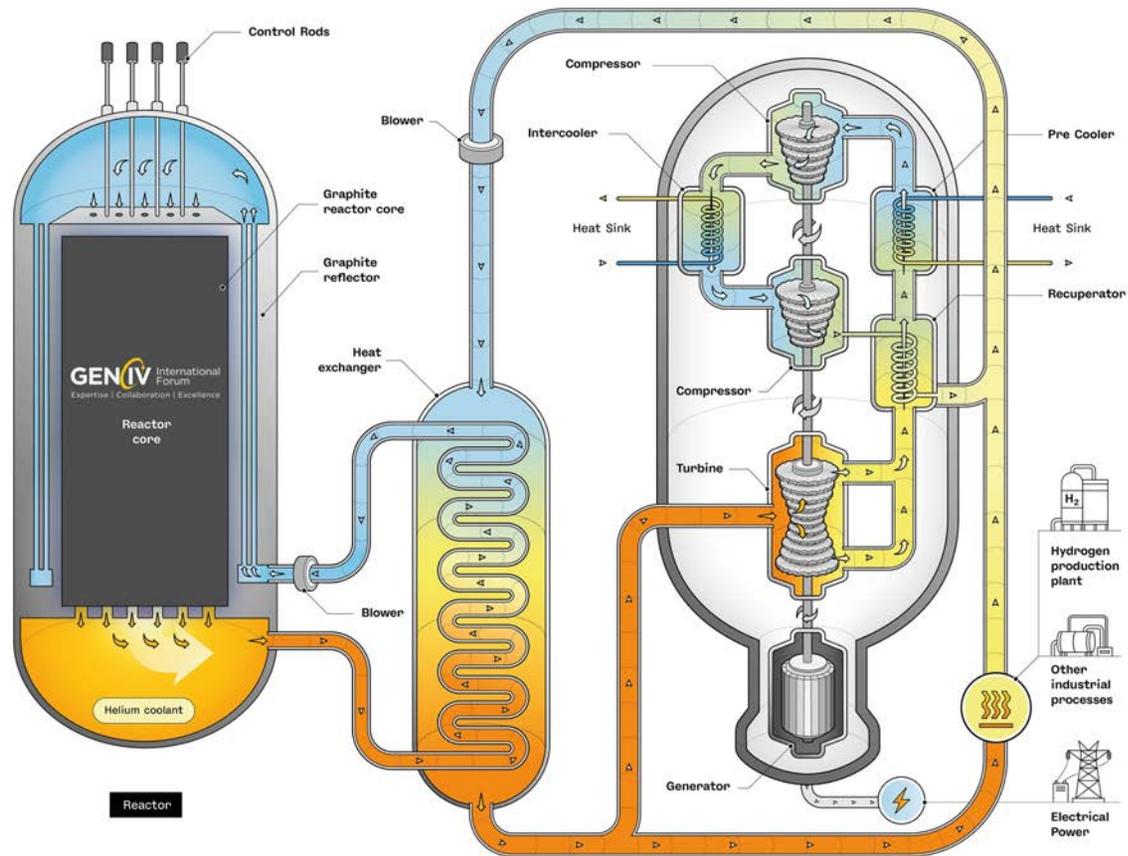


Figure 2.1-5 Very-High-Temperature Reactor Diagram

(GIF 2025)

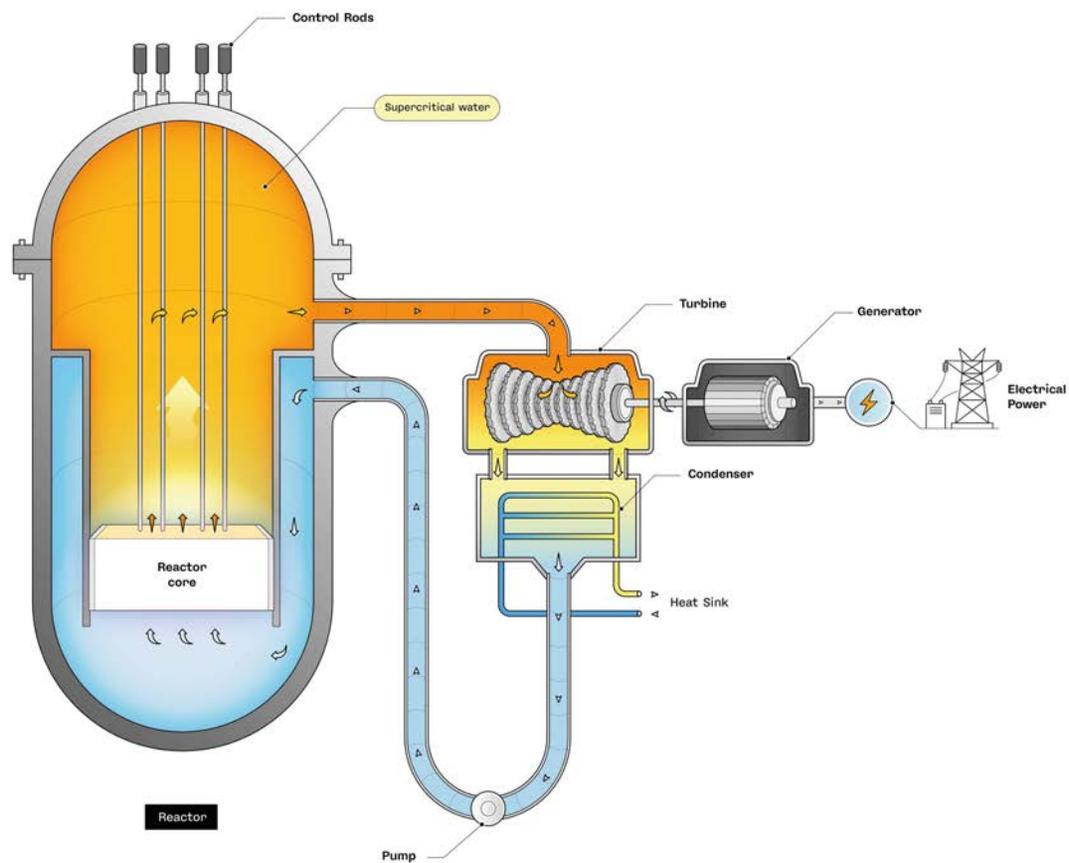


Figure 2.1-6 Supercritical Water-Cooled Reactor Diagram

(GIF 2025)

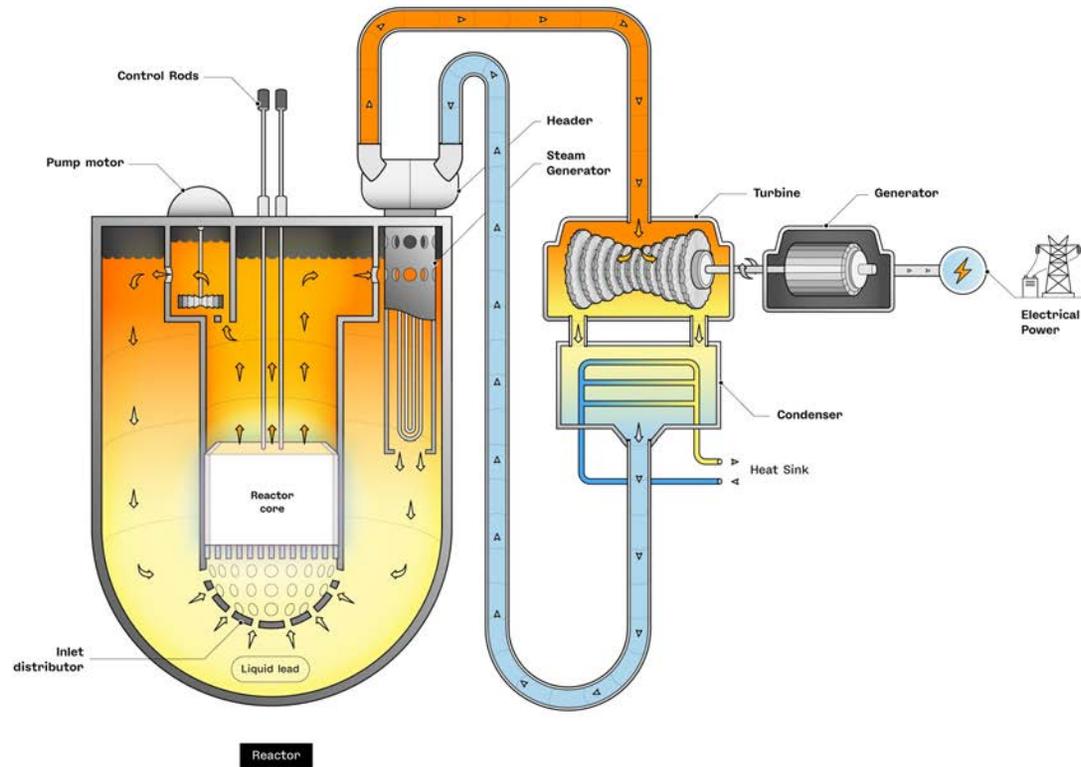


Figure 2.1-7 Lead-Cooled Fast Reactor Diagram

(GIF 2025)

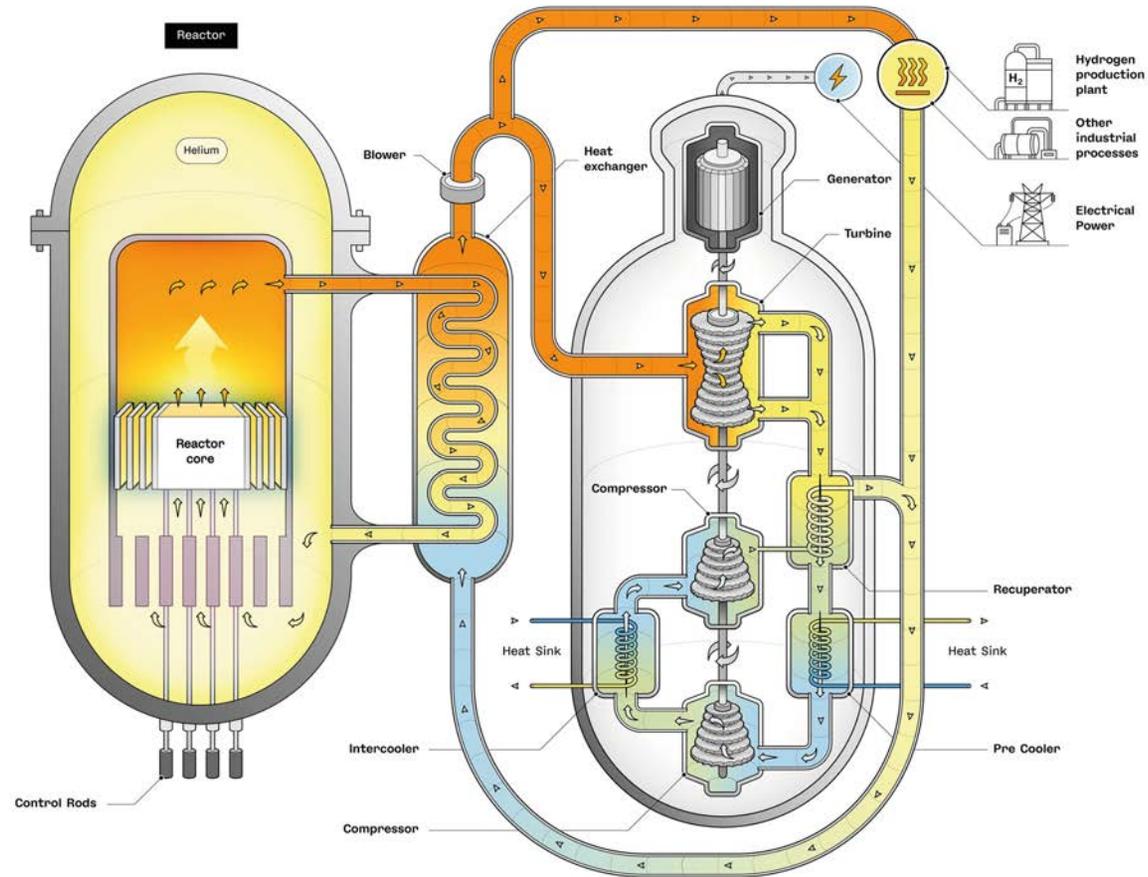


Figure 2.1-8 Gas-Cooled Fast Reactor Diagram

(GIF 2025)

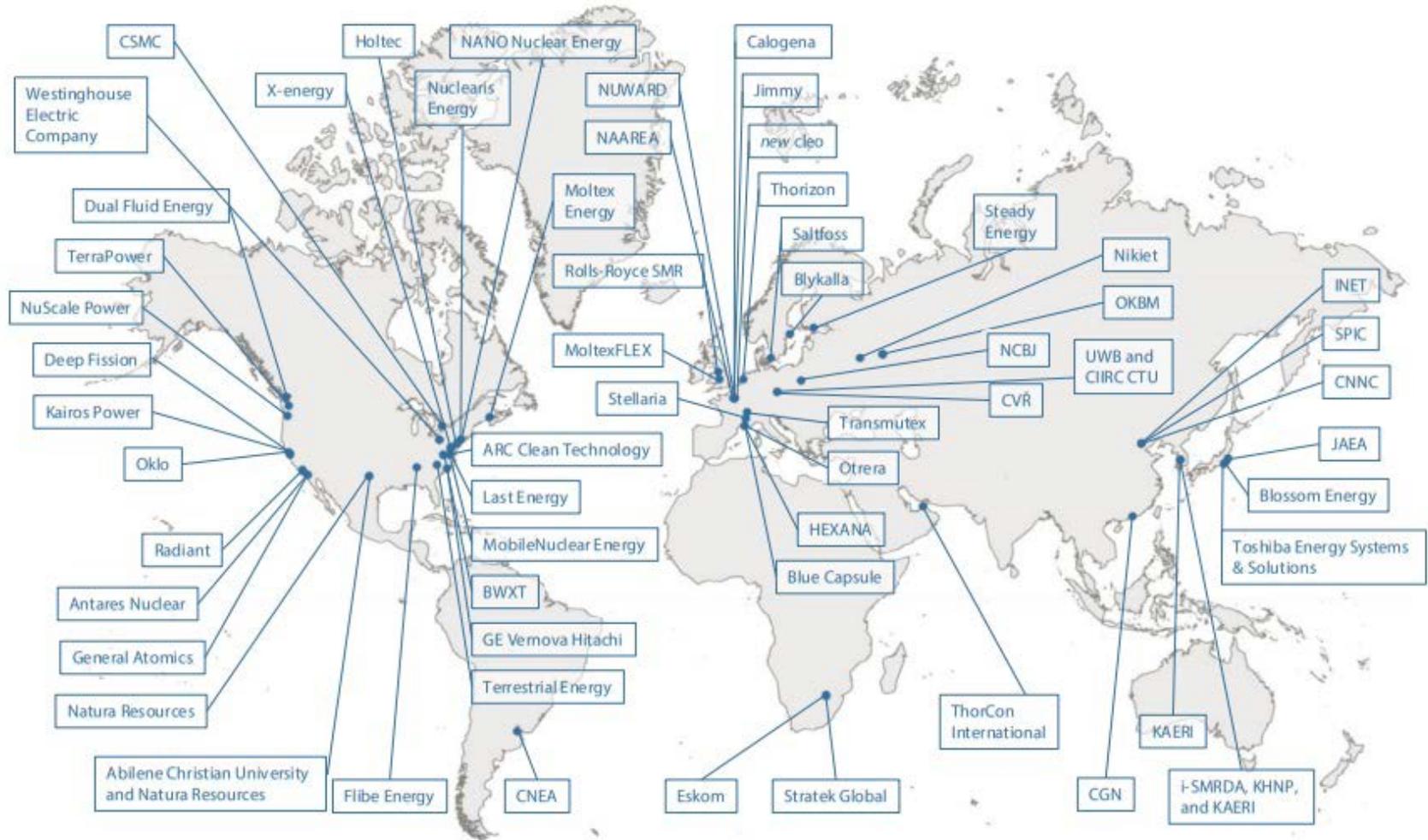


Figure 2.1-9 Map of Generation IV Designers

(NEA 2025)

	KP-FHRT™ Kairos Power	Natrium™ TerraPower/GE Hitachi	ARC-100™ ARC Clean Technology
FUNCTION	Flexible Electricity	Flexible Electricity, Desalination, Chemical Synthesis, Black start capability	Flexible Electricity, Desalination, Chemical Synthesis, Black start capability
NEUTRON SPECTRUM	Thermal	Fast	Fast
MODERATOR	Graphite	None (Fast)	None (Fast)
HEAT TRANSFER MECHANISM	Molten Fluoride Salt	Liquid Sodium	Liquid Sodium
OUTLET TEMP	650 °C	540 °C	510 °C
FUEL			
Enrichment	HALEU	HALEU	HALEU
Fuel Form	TRISO	Metallic U-Zr	Metallic U-Zr
Refueling Period/Method	Online	24 months	up to 240 months
POWER OUTPUT			
Classification	FHR-SMR	SFR-SMR	SFR-SMR
Base Model Output (MWe or MWt)	150 MWe	345-100-500 MWe*	100 MWe
REGULATORY PROGRESS			
Government Support	DOE ARDP Risk Reduction Award Winner - \$629 million cost-shared agreement; DOE share: \$303 million	DOE ARDP Demonstration Award Winner (\$1.97 billion)	US\$27.5 million awarded by DOE ARDP ARC-20 Program; CAD32 million awarded by the Government of Canada and the Province of New Brunswick, Canada
NRC Status	Hermes demo CP issued Dec 2023 Hermes 2 CP issued Nov 2024	Construction permit application submitted March 2024; Review duration shortened from 26 months to 19 months	Preapplication engagement
CNSC Status	None	None	License to Prepare Site submitted in 2023; currently under CNSC review
Deployment Expected	Hermes demonstration reactor: 2027 Hermes 2 plant: 2030	ARDP (USA) Project Demonstration: 2030	Point Lepreau (Canada) Project: 2029

*Reactor produces a constant 345 MWe. With heat storage in salt, generator output can be varied from 100 MWe to 500 MWe, depending on grid requirements.

Figure 2.1-10 Molten Fluoride Salt-Cooled High-Temperature Reactor and Sodium-Cooled Fast Reactor Comparison

(NIA 2025)

	Xe-100™ X-energy	Fast Modular Reactor™ General Atomics	Energy Multiplier Module™ General Atomics
FUNCTION	Flexible Electricity, Hydrogen Production, Industrial Processes	Flexible Electricity, Hydrogen Production, Industrial Processes	Flexible Electricity, Hydrogen Production, Industrial Processes
NEUTRON SPECTRUM	Thermal	Fast	Fast
MODERATOR	Graphite	None (Fast)	None (Fast)
HEAT TRANSFER MECHANISM	Helium Gas	Helium Gas	Helium Gas
OUTLET TEMP	750 °C	800 °C	850 °C
FUEL			
Enrichment	HALEU	HALEU	HALEU
Fuel Form	TRISO	UO ₂ in silicon carbide	Uranium Carbide
Refueling Period/Method	Online	180 months	360 months
POWER OUTPUT			
Classification	HTGR-SMR	GFR-SMR	GFR-SMR
Base Model Output (MWe or MWt)	80 MWe	44 MWe	265 MWe
Plant Scalability Output (MWe)	320 MWe (x4)	≥ 1 (≥ 44 MWe)	1060 MWe (x4)
REGULATORY PROGRESS			
Government Support	DOE ARDP Demonstration Award winner (up to \$1.25 billion)	DOE ARDP ARC-20 Award winner (\$31.1M)	
NRC Status	Construction permit application submitted March 2025; 18-month review timeline	Preapplication engagement	Preapplication engagement
CNSC Status	VDR Phase 1 and 2 completed January 2024	None	None
Expected Deployment:	ARDP (USA) Project Demonstration: Early 2030s	Mid-2030s	Not publicly available

Figure 2.1-11 High-Temperature Reactor and Gas-Cooled Fast Reactor Comparison

(NIA 2025)

	Aurora Powerhouse™ Oklo	Project Pele™ BWXT	Aalo-1 Aalo Atomix™	eVinci™ Micro Reactor Westinghouse
FUNCTION	Microgrids, Extended Core Lifetimes, District Heating, Black start capability	Microgrids, Military Applications, Disaster Relief, Remote Communities	Small datacenters; Small cities	Microgrids, Remote Community Mining, Offshore, District Heating, Transportability, Extended Core Lifetimes, Black start capabilities
NEUTRON SPECTRUM	Fast	Not publicly available	Fast	Thermal
MODERATOR	None (Fast)	Not publicly available	None (Fast)	Graphite
HEAT TRANSFER MECHANISM	Liquid Sodium	Not publicly available	Sodium	Heat Pipes, Liquid Sodium
OUTLET TEMP	>500 °C	Not publicly available	500-525°C	>750 °C
FUEL				
Enrichment	HALEU (or recycled TRU)	HALEU	Uranium-Zirconium Hydride (UZrH)	HALEU
Fuel Form	Metallic U-Zr	TRISO	Uranium-Zirconium Hydride (UZrH)	TRISO
Refueling Period/Method	not publicly available	Not publicly available but at least >36 months	Not publicly available	96 months +
POWER OUTPUT				
Classification	Micro	Micro	Micro	Micro
Base Model Output (MWe or MWt)	up to 75 MWe	1-5 MWe	10 MWe	5 MW
REGULATORY PROGRESS				
Government Support	Idaho National Lab gave a Site Use Permit and will supply HALEU for fuel. Oklo was issued a notice of intent to award to provide power for Eielson Air Force Base (EAFB) in Alaska.	Project Pele: DOD-SCO Project Pele winner (\$300M)	None	DOD-SCO award (\$12M), DOE ARDP Risk Reduction award winner (\$9.3M), Canadian SIF award winner (CAD 27.2M)
NRC Status	Pre-application engagement; completed pre-application readiness assessment for Phase 1 of the combined license application (COLA)	Project Pele: N/A (DOE authorized) - NRC Observing	Regulatory Engagement Plan submitted in June 2024	Principal design criteria (PDC) topical report approved March 2025
CNSC Status	None	None	None	VDR Phase 2 Application under development
Expected Deployment	INL (USA) Project: 2027 SODI (USA) Project: Late 2020s EAFB (USA) Project: Late 2020s	Project Pele(USA): 2027	Not publicly available	2030

Figure 2.1-12a Micro-Reactor Specifications, Part 1

(NIA 2025)

	XENITH™; Xe-Mobile™ X-energy	Kaleidos™ Radiant	BWXT Advanced Nuclear Reactor (BANR) BWXT
	Microgrids, Combined Power and Heat, Military Applications	Microgrids, Combined Power and Heat, Diesel Replacement,	Microgrids, Industrial Heat and Power, Remote Communities,
NEUTRON SPECTRUM	Thermal	Thermal	Thermal
MODERATOR	Not publicly available	Graphite	Graphite
HEAT TRANSFER MECHANISM	Helium Gas	Helium Gas	Nitrogen
OUTLET TEMP	>750 °C	Unknown	> 650°C
FUEL			
Enrichment	HALEU	HALEU	HALEU
Fuel Form	TRISO	TRISO	TRISO
Refueling Period/Method	Approaching 20-year lifetime with no refueling	60 months, with a total 20-year product lifetime	> 60 months
POWER OUTPUT			
Classification	Micro; Micro	Micro	Micro
Base Model Output (MWe or MWt)	3-10 MWe	1.2 MWe	22 MWe
REGULATORY PROGRESS			
Government Support	Xe-Mobile: DOD-SCO Project Pele finalist (\$60M); DIU / ANPI Awardee	Unknown	BANR: DOE ARDP Risk Reduction Award winner (\$106.6M)
NRC Status	XENITH: Conceptual Design docketed	Unknown	BANR: QA Topical Report submitted to NRC
CNSC Status	None	Unknown	None
Expected Deployment	XENITH Project: 2031 Xe-Mobile Project: Not publicly available	Kaleidos Project: Late 2020s	BANR: 2030s

Figure 2.1-12b Micro-Reactor Specifications, Part 2

(NIA 2025)

	Molten Chloride Fast Reactor TerraPower	Molten Salt Research Reactor™ Abilene Christian University	Integral Molten Salt Reactor™ Terrestrial Energy	Stable Salt Reactor™ Moltex
FUNCTION	Flexible Electricity, Molten Salt Energy Storage, Process Heat	University-led Research Program	Flexible Electricity, Desalination, Chemical Synthesis, Black start capability	Flexible Electricity, Desalination, Hydrogen, UNF Recycling, Black start capability
NEUTRON SPECTRUM	Fast	Thermal	Thermal	Fast
MODERATOR	None (Fast)	Graphite	Graphite	None (Fast)
HEAT TRANSFER MECHANISM	Molten Chloride Salt	Molten Fluoride Salt	Molten Fluoride Salt	Molten Fluoride Salt
OUTLET TEMP	735 °C	500 °C	>600 °C	700 °C
FUEL				
Enrichment	HALEU	HALEU	LEU	HALEU
Fuel Form	U-Molten Chloride	U-Molten Fluoride	U-Molten Fluoride	Solid Fuel
Refueling Period/Method	Online	Online	Online	Online
POWER OUTPUT				
Classification	MSR-SMR (mid-scale)	MSR-Micro	MSR-SMR	MSR-SMR
Base Model Output (MWe or MWt)	300-170-430* MWe (mid-scale) 780-650-910* MWe (large-scale)	Test Reactor: 1 MWth	195 MWe	300-500 MWe
Plant Scalability Output (MWe)			390 MWe (x2)	
REGULATORY PROGRESS				
Government Support	One of five ARDP Risk Reduction awards with DOE support of \$136M on total project of \$171M	\$30.5M USD	Over \$40M USD support from US, UK, CDN governments and over \$1B USD loan guarantees from LPO.	\$40M CAD million investment by Canadian federal government, and support from Ontario Power Generation
NRC Status	Preapplication engagement	Construction permit issued September 2024	Preapplication engagement	
CNSC Status	None	None	VDR Phase 1 and Phase 2 complete	VDR Phase 1 complete, Phase 2 preparations underway
Deployment Expected	INL (USA) Test Experiment Project: 2025/2026	ACU (USA) Site: Late 2020s	Early 2030s	Not publicly available

Figure 2.1-13 Molten Salt Reactor Specifications

(NIA 2025)

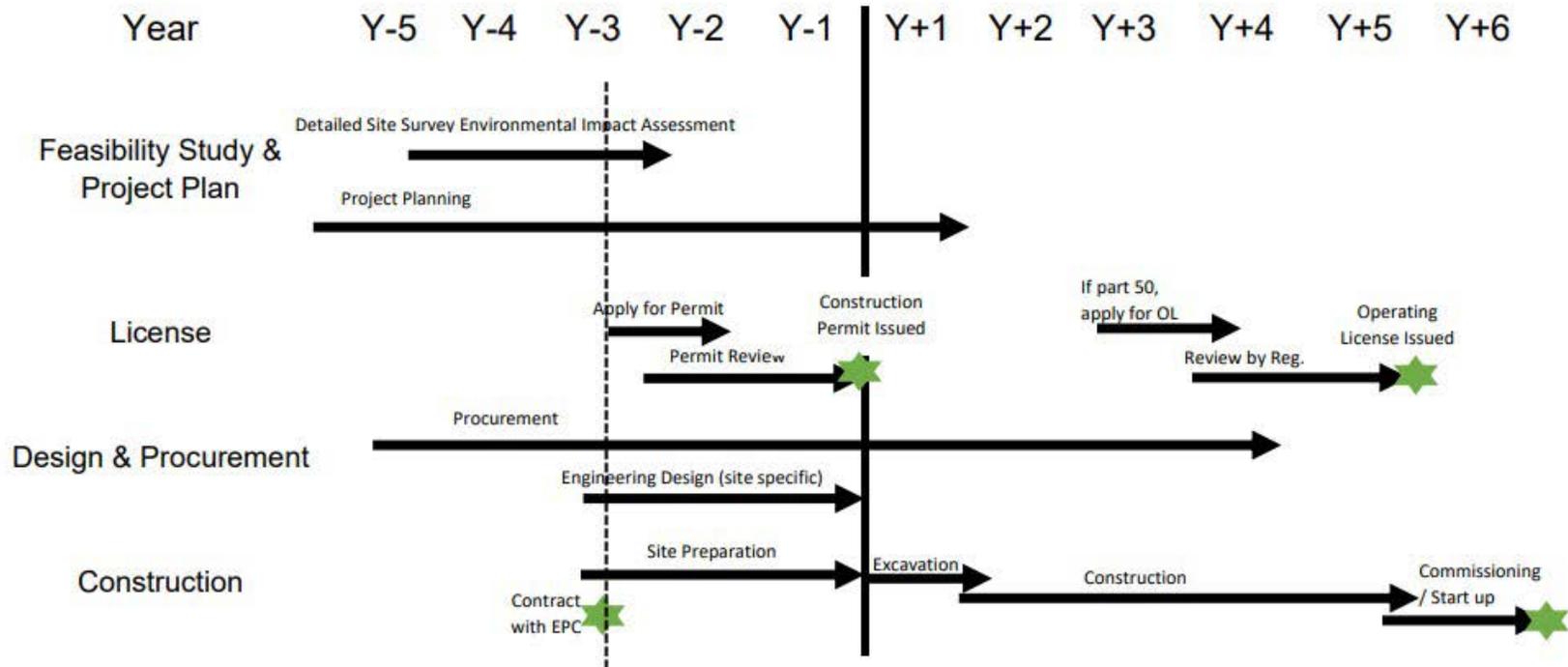


Figure 2.1-14 DOE Nuclear Power Plant Construction Timeline

(DOE 2023; MPSC 2024)

2.2 Nuclear Siting Considerations

This section provides an overview of new nuclear power siting considerations, including federal, nuclear industry, and state environmental siting considerations. A discussion of potentially co-locating nuclear facilities at existing generation plants and military installations is also provided.

2.2.1 Environmental and Safety Siting Considerations

The deployment of commercial nuclear energy generation facilities requires NRC approval for construction and operation. Before preparing an application for a new nuclear facility, an applicant must select a suitable site that satisfies business objectives for the project, meets regulatory requirements for construction and operation for a nuclear plant, and complies with any process requirements for the consideration of alternative sites. (EPRI 2022)

2.2.1.1 NRC Siting Considerations

The NRC's approach to nuclear siting prioritizes regulatory compliance and site characteristics related to public health, safety, and environmental issues. The NRC's Regulatory Guide 4.7, General Suitability Criteria for Nuclear Power Stations, Rev. 4, applies to nuclear power reactor licenses under Title 10, Energy, Code of Federal Regulations (CFR) Parts 50 and 52 (NRC 2024a). It addresses requirements in 10 CFR Part 51 (Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions) and 10 CFR Part 100 (Reactor Site Criteria). The guidance assists applicants for commercial nuclear licenses in evaluating key siting criteria and site suitability with respect to public health, safety, and environmental considerations, including population considerations as they relate to protecting the public from potential hazards; potential effects on a nuclear facility from accidents associated with surrounding industrial, transportation, and military facilities; and geologic/seismic, hydrologic, and meteorological characteristics of proposed sites.

Deployment of nuclear facilities in the United States is a major federal action, and site selection is subject to NEPA. The NRC conducts a full NEPA analysis as part of the application review process in accordance with 10 CFR Part 51 and as clarified by guidance for license applicants in NRC Regulatory Guide 4.2, Revision 3 (Preparation of Environmental Reports for Nuclear Power Stations), and guidance to NRC staff in NUREG-1555 (Standard Review Plan for Environmental Reviews for Nuclear Power Plants). Regulatory Guide 4.7 guides applicants in addressing NEPA environmental considerations, including potential impacts from construction and operation of commercial nuclear power stations on ecological systems, water use, land use, atmosphere, aesthetics, noise, and socioeconomics. Following the site selection process detailed in Regulatory Guide 4.7 will ensure that the required environmental report for a license application meets the requirements of Regulatory Guide 4.2 in accordance with the guidance of NUREG-1555. (NRC 2024a)

Regulatory Guide 4.7 is intended to assist commercial nuclear power applicants in the initial phase of selecting potential sites for nuclear power generation facilities by evaluating the

compatibility of a site with general siting criteria. Potential sites that are compatible with siting criteria are then further evaluated for consideration as “preferred” or “proposed” sites for nuclear power. The applicant submits the “preferred” or “proposed” site to the NRC for a construction permit, early site permit, or combined license application. (NRC 2024a)

2.2.1.2 Nuclear Industry Siting Considerations

The nuclear industry developed siting guides that align with NRC regulations and guidance while also considering business drivers such as power demand, cost optimization, and reuse of existing sites. The Electric Power Research Institute (EPRI) issued a revised technical report, *Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide)*, in 2022, which has been widely adopted in conducting site selection reviews (EPRI 2022). Like the NRC’s approach, the EPRI Siting Guide addresses considerations associated with public health, safety, and the environment, but it differs in that it provides a regulatory-neutral, risk-informed, decision-support-oriented process to support business optimization. The Siting Guide was developed with a focus on future owner-operators, technology developers and vendors, and engineering firms interested in pursuing siting and licensing applications of new nuclear energy generation facilities, and it provides a framework for applicants to use in developing a detailed siting plan.

The 2022 revision reflects significant changes in the landscape for new nuclear power plant deployment with the inclusion of specific guidance for selecting sites for non-LWRs, guidance for siting a nuclear reactor at a brownfield non-generation site, expanded considerations for other owner-operator siting and business cases and potential deployment options, and expanded consideration for economic factors, environmental justice, and public engagement. It also addresses regulatory changes since the previous version published in 2015. The 2022 revision also emphasizes considering advanced reactors, new goals beyond baseload electricity generation, and the potential reuse of existing sites and facilities, such as decommissioned nuclear facilities and coal plants. (EPRI 2022)

The Siting Guide provides a comprehensive, methodical process that aligns with guidance for the site selection process set forth in Regulatory Guide 4.7. Siting considerations include many of the environmental impacts addressed in the environmental reports that are required to accompany license applications. The process starts with defining the region of interest that represents a geographic area where the site must be located to meet project objectives. Through a series of evaluations based on siting criteria and increasing levels of study, potential sites are narrowed down to candidate sites and alternative sites for further analysis until a proposed site is selected. (EPRI 2022) Figure 2.2-1 provides an example of the siting process.

The Siting Guide was developed specifically to locate and evaluate a collection of potential sites, determine a proposed site, and identify alternative sites within a region of interest. However, there is growing interest in the deployment of nuclear power generation facilities on owned land and near existing facilities. This is driven by an anticipation that advanced reactor

designs will be more compact and potentially deployable closer to populations, offering new siting opportunities. In response to this emerging siting consideration, the EPRI published a Single Site Evaluation Guide in 2024 that can be used in conjunction with the Siting Guide to evaluate site potential at existing host sites. (EPRI 2024)

2.2.1.3 State Siting Considerations

There are currently no state-specific regulations on the siting of nuclear power facilities in Oklahoma. Should a solid waste or hazardous waste facility need to be sited or considered in association with a new nuclear facility, the following existing criteria, as promulgated by the Oklahoma Department of Environmental Quality (DEQ), could be considered: Oklahoma Administrative Code (OAC) 252:515 and OAC 252:204. These criteria are designed to protect people and the environment. While some of the criteria listed below are addressed in NRC federal regulations, others may be more explicit and/or stringent.

Examples of state-specific siting criteria used for solid waste facilities based on OAC 252:515, Chapter 5, include the following restrictions on site placement. Solid waste facilities may not be sited:

- Within the drainage basin of a scenic river;
- On unconsolidated alluvial and/or terrace aquifers and recharge areas and bedrock aquifer recharge areas [OAC 252:515-5-51(a)];
- Within half a mile of a recreation/preservation area;
- Within a 100-year floodplain;
- In wetland areas as designated by the Oklahoma Conservation Commission or other appropriate agency;
- Within 1 mile upgradient of an existing public water supply surface water intake, or one that is permitted for construction when a complete application has been filed with the DEQ or a 1-year time of travel of a public water supply well;
- Within a wellhead protection area;
- Within 200 feet of a fault with a displacement in the Holocene;
- Within a seismic impact zone;
- Over karst terrain;
- Within 5 miles of a known epicenter of an earthquake of more than 4.0 on the Richter Scale or a number V on the Modified Mercalli Intensity Scale, as recorded by the Oklahoma Geological Survey; or
- Over a subsurface mining area or any other unstable area.

Exclusionary siting criteria for hazardous waste disposal facilities are similar, with a few key differences outlined in OAC 252:205-22-2. These criteria prohibit sites that are:

- Located wholly or partially within an area designated as an actual or potential unconsolidated alluvial aquifer, terrace deposit aquifer, bedrock aquifer, or recharge area, as shown on Oklahoma Geological Survey maps;
- Located within one-quarter mile of any public or private water supply well, except private water supply wells on the applicant's property;
- Within a 100-year floodplain, except for post-closure, corrective action, or remedial activities conducted under DEQ direction;
- Within 1 mile of the conservation pool elevation of any reservoir that supplies public water or within 1 mile of a scenic river; or
- Within 1 mile of a public school, educational institution, nursing home, hospital, or park.

Other requirements include provisions for a facility to upgrade roads and bridges to reasonable measures as determined by the appropriate board of county commissioners or to Oklahoma Department of Transportation design standards for industrial access roads.

2.2.2 Considerations for Co-Locating Nuclear Facilities at Military Installations

Energy resilience has emerged as a foundational consideration in national security, economic stability, and critical infrastructure planning. Oklahoma's energy system supports a diverse set of critical functions, including military installations, industrial activity, transportation, healthcare, and data-intensive services. As such, energy resilience in Oklahoma is increasingly viewed as a system-level attribute rather than a site-specific characteristic. Resilience is achieved through a combination of generation diversity, fuel security, transmission and distribution robustness, and coordination across public and private stakeholders.

Oklahoma's military installations represent a unique intersection of national security, critical infrastructure, and community resilience. As federally operated facilities with defined mission requirements, these installations introduce resilience considerations that extend beyond traditional utility planning and offer insight into the types of energy capabilities that may be required to support long-term operational continuity. From a statewide perspective, the presence of multiple military installations creates an opportunity for Oklahoma to align its energy planning with federal resilience objectives, providing a potential pathway for advancing capacity, scalability, and sustainability in a manner that benefits installations, surrounding communities, and the broader electric grid.

2.2.2.1 Department of Defense Energy Resilience Considerations

The DoD has identified energy resilience as a mission-critical requirement for military installations. Federal statutes and policy directives emphasize the importance of ensuring that critical missions can continue during extended grid disruptions, including the capability to operate in islanded or degraded grid environments for sustained periods.

Recent federal policy developments indicate an evolving approach to installation energy resilience. While individual military branches historically have pursued installation-specific initiatives, current efforts reflect increased coordination and standardization, with the Army taking the lead in developing advanced nuclear energy programs on behalf of the DoD.

Military installations are no longer seen as independent energy consumers acting in isolation. Instead, they function as nodes within a larger resilience network that includes surrounding communities, utilities, and state-level infrastructure. Decisions regarding advanced energy technologies, including nuclear energy, are influenced by mission criticality, federal prioritization, regulatory pathways, and long-term operational considerations rather than by local siting interest alone.

Federal partners and qualified industry experts have underscored the importance of patience and coordination when evaluating advanced energy technologies for mission-critical applications.

2.2.2.2 Military-Adjacent Siting as a Resilience Enabler

One potential approach to supporting DoD energy resilience objectives is to site advanced energy facilities on or immediately adjacent to military installations. Proximity to such installations may offer advantages related to physical security, force protection, operational coordination, and the ability to support islanded operations during extended grid disruptions.

Several Oklahoma communities possess land holdings adjacent to military installations that are compatible with energy infrastructure development. In these cases, local governments may be positioned to support federally led resilience initiatives by offering flexible land use arrangements, including easements, rights-of-way, or other property mechanisms that facilitate project evaluation and development without constraining federal decision-making.

For example, the City of Altus owns land immediately adjacent to Altus Air Force Base that has been discussed conceptually as a suitable site for energy infrastructure co-location. Local leadership has indicated a willingness to explore a range of land use options, including potential property transfer mechanisms, should such arrangements be determined by federal authorities to best support mission resilience objectives.

2.2.2.3 Advanced Nuclear Energy Within a Resilience Portfolio

Advanced nuclear energy technologies, including SMRs and microreactors, are of increasing interest at the federal level as potential contributors to long-term energy resilience due to their dispatchability, fuel longevity, and ability to operate independently of continuous fuel delivery. At present, these technologies remain at varying stages of development and demonstration, with deployment timelines generally extending into the late 2020s and beyond. Evaluation of nuclear energy in Oklahoma must therefore be framed within the state's existing energy mix, regulatory environment, and economic considerations, as well as within the evolving federal stance on military installation energy resilience.

Fort Sill provides another perspective on energy needs and resilience. In concert with Army energy planning, Fort Sill is not currently pursuing nuclear energy technologies. Current plans include expanding natural gas use for facilities, vehicles, and backup energy technologies as opposed to electrification. Due to its relatively modest energy demand, Fort Sill has limited its engagement with SMRs to research and high-level discussions. However, the modularity of SMRs provides flexibility to support future growth if needed.

The City of Lawton is located just outside Fort Sill's main cantonment gates, and the communities of Cache, Elgin, and Medicine Park border its firing ranges. However, it is not anticipated that any electricity generated at Fort Sill will leave the installation during these early initiatives because the microreactor will produce less than the installation's baseline energy requirement.

2.2.2.4 Ongoing Federal Alignment and Strategic Awareness

As federal policy related to advanced nuclear energy continues to evolve, it is increasingly important for state and local stakeholders to remain closely aligned with DoD initiatives, including those led by the Army and Air Force. These efforts will shape how and where advanced nuclear technologies may be evaluated, demonstrated, or deployed in support of mission assurance and national security objectives.

Oklahoma's military installations, viewed collectively, may offer one of the most practical pathways for understanding how advanced nuclear technologies could contribute to future energy resilience. Continued coordination among federal, state, and local stakeholders will be essential to realizing these potential benefits in a manner consistent with mission needs, regulatory obligations, and the public interest over time.

2.2.3 Summary of Key Siting Considerations for Oklahoma

As noted in Section 2.2, siting for a nuclear facility includes a review of site suitability based on the nuclear technology identified for deployment and a review of public health, safety, and environmental considerations associated with building and operating a plant. As Oklahoma considers the potential for nuclear power in the state, a preliminary, high-level review of siting

considerations for the state was conducted based on Regulatory Guide 4.7 and the EPRI Siting Guide (NRC 2024a; EPRI 2022). The review identified topical areas, including:

- Transmission considerations
- Water sources and availability considerations
- Safety and hazard considerations
- Land use considerations
- Environmental and ecological considerations.

An additional consideration, co-locating nuclear facilities, was discussed in Section 2.2.2. The review of the topics listed above utilized publicly available Geographic Information System resources and general guidance from Regulatory Guide 4.7 and the Siting Guide to evaluate siting considerations for developing nuclear power generation within the state. The following sections provide a high-level summary of the preliminary review.

2.2.3.1 Transmission Considerations

Transmission accessibility considers both the presence of existing infrastructure and the costs associated with building new interconnections. According to the Siting Guide, the applicability of this criterion depends on an individual owner-operator's geographic business environment and whether it is the owner-operator's responsibility to construct transmission connections at one or more sites under consideration. When screening for candidate sites, cost estimates are based on the total miles of transmission line required to connect to the existing transmission grid (by line voltage) as well as potential difficulties associated with construction conditions or high costs. (EPRI 2022) Figure 2.2-2 depicts the existing transmission lines by voltage within Oklahoma. For this review, transmission lines ranging from 100 kilovolts to 500 kilovolts were identified, and a 10-mile buffer was applied as a reasonable distance for evaluating the proximity of any given area to the existing transmission system.

2.2.3.2 Water Sources and Availability

Cooling demand is a critical factor in site selection that often meets with regulatory challenges requiring innovative solutions. The Siting Guide notes that the evaluation of cooling water supply depends on the technology being deployed and its associated cooling water demand levels. Smaller reactors will require significantly less cooling water per unit than other technologies. The cooling water supply evaluation should include the quantity and quality of cooling water and the effects of withdrawal on source water quantity and quality. Once the nuclear technology has been identified, the cooling demand level should include all cooling options and their supply requirements and should allow for fluctuations in source water quantity and regulatory policies without being overly conservative or restricting potentially viable sources. (EPRI 2022)

Cooling water sources within Oklahoma that can meet the cooling water demand (either singularly or in combination) should be identified. Sources of cooling water may include surface

water (rivers, lakes), groundwater, and reclaimed water supplies (e.g., water treatment plant effluent). Average surface water flow rates should be identified and based on a minimum acceptable average flow that accounts for other potential surface water users. Acceptable water flows should be identified based on flow history and regulatory policy. Cooling water sources unable to meet the plant's cooling water demand would be excluded from further consideration. (EPRI 2022)

The DEQ is the primary state agency for managing the state's surface water resources, water quality standards, and water use permitting. As required by SB 1325 and House Bill 3824, on November 1, 2022, the DEQ promulgated two new rules governing water quality: Chapter 730, "Oklahoma's Water Quality Standards," and Chapter 740, "Implementation of Oklahoma's Water Quality Standards." As of 2017, Oklahoma had nearly 56,000 miles of shoreline along lakes and ponds, containing approximately 1,400 square miles of water, and approximately 167,000 miles of rivers and streams (OSUE 2017). Figure 2.2-3 depicts major rivers and lakes representing potential surface water sources for a nuclear facility, as identified by the Oklahoma Water Resources Board (OWRB). As depicted in Figure 2.2-3, many of the state's largest reservoirs and potential surface water resources are in eastern Oklahoma, making that portion of the state a better candidate area for surface cooling water supply than other portions of the state. A formal site screening would further evaluate available groundwater and reclaimed water sources.

2.2.3.3 Safety and Hazard Considerations

Safety and hazard considerations for assessing site suitability include seismic/geologic concerns, hazardous land uses, areas of higher population density, and a site's proximity to such areas.

2.2.3.3.1 *Seismic/Geologic Considerations*

Commercial nuclear plants must be designed to prevent the loss of safety-related functions. The most restrictive safety-related site characteristics in determining site suitability are potential surface faulting, ground motion, foundation conditions, and potential floods and water waves induced by seismic activity. (NRC 2024a) Current NRC regulations identify three geologic, seismologic, and soil parameters that must be evaluated. First, the safe shutdown earthquake must be determined based on information about capable tectonic structures and sources to establish a vibratory ground motion design basis. Second, the occurrence or potential for surface faulting or deformation must be identified to evaluate site conditions with respect to standard facility designs. Finally, other geological conditions (such as geological hazards and soil characteristics) that could affect the safety of a facility must be evaluated. A common exclusion criterion is an area where regional hazard maps show that peak ground acceleration exceeds the design requirements for a safe shutdown earthquake. In the absence of specific design information, a peak ground acceleration threshold of 0.3 times the acceleration of gravity is typically assigned for large LWRs. Recent NRC license applications for advanced reactors

indicate that a value of 0.5 times the acceleration of gravity is reasonable; however, this criterion is design dependent. (EPRI 2022)

The Federal Emergency Management Agency (FEMA) Seismic Design Category (SDC) maps are useful for identifying areas likely to experience earthquakes. Building design and construction professionals commonly determine the level of seismic resistance required for new buildings based on SDC maps, which informed this review. Each SDC is assigned a hazard level and associated shaking levels. These also take into account the site's soil type because poor soils can significantly increase earthquake shaking. FEMA ranks seismic hazard probability from A (low probability) to E (high probability) and defines each as follows (FEMA 2025):

- SDC A: Very small probability of experiencing damage earthquake effects. No potential effects.
- SDC B: Could experience shaking of moderate intensity. Moderate shaking can cause slight damage.
- SDC C: Could experience strong shaking. Strong shaking can lead to negligible damage in buildings of good design and construction, slight to moderate damage in ordinary structures, and considerable damage in poorly built structures.
- SDC D: Could experience very strong shaking. Very strong shaking can cause slight damage in specially designed structures; considerable damage, with partial collapse, in ordinary substantial buildings; and great damage in poorly built structures. SDC D is subdivided into levels D, D1, and D2.
- SDC E: Near major active faults capable of producing the most intense shaking. Strongest shaking can cause considerable damage in specially designed structures, with frame structures thrown out of plumb, and great damage and partial collapse in substantial buildings, with structures shifted off foundations. Shaking is intense enough to completely destroy buildings.

SDC descriptions are based on the Modified Mercalli Intensity Scale, which classifies earthquake intensity based on observed effects (FEMA 2025). According to FEMA's earthquake hazard maps, large portions of central, southwestern, and eastern Oklahoma are within the SDC B hazard zone, while areas in Comanche and Kiowa Counties in southwestern Oklahoma fall within zones as high as SDC D1. The highest hazard zones are associated with the Meers fault, which U.S. Geological Survey seismic hazard maps classify as a quaternary fault (FEMA 2025; USGS 2025). This type of fault represents capable tectonic structures that may generate strong ground motion. Regulatory Guide 4.7 notes that locations farthest away from capable or potentially capable tectonic structures are considered more suitable candidate sites and that the presence of capable tectonic structures will seriously increase the time required for licensing, cost of licensing, and the risk of license denial. (NRC 2024a) Figure 2.2-4 depicts FEMA SDC zones and the Meers fault.

2.2.3.3.2 *Nearby Hazardous Land Use Considerations*

Along with the characteristics of a potential site, hazardous land use siting criteria evaluate potential hazards associated with transportation routes and industrial and military facilities to ensure that nearby hazards will pose no undue risk to a nuclear facility. Accidents at facilities including airports, existing power plants, military installations, chemical refineries, and dams, as well as accidents associated with the transport of hazardous materials via nearby transportation routes, may affect nuclear plant operations and jeopardize plant safety. Regulatory Guide 4.7 requires a license applicant to identify any potentially hazardous facilities or activities within 5 miles of a proposed site and any airports within 10 miles of the site. (EPRI 2022; NRC 2024a) For this review, military installations and major airports were identified as the largest potentially hazardous land uses. Per the guidance, a 10-mile buffer was applied around commercial airports and a 5-mile buffer around military installations to exclude avoidance areas and less suitable nuclear siting areas (see Figure 2.2-5). As noted in Section 2.2.2, there is a potential for siting a nuclear facility near a military installation pending further evaluation and approval; however, given that no specific installation or adjacent city or land area has been identified, all military installations within the state were included as avoidance areas based on recommendations provided in the Siting Guide. A detailed review of smaller facilities—such as refineries, chemical facilities, mines, and oil and gas wells and pipelines—and their proximity to transportation routes would be conducted during a site evaluation.

2.2.3.3.3 *Population Considerations*

Areas that pose lower risks to the public from the effects of a severe nuclear accident are preferred for siting a nuclear facility. Evaluating the suitability of a site should include reviewing its proximity to high-population areas. Regulatory Guide 4.7 recommends locating reactors away from densely populated centers and areas where, within 5 years of initial plant approval, the population density (which includes weighted transient populations) averaged over any 20-mile radius does not exceed 500 persons per square mile. Using a population density limit of 300 persons per square mile is considered a conservative surrogate for the recommendation in Regulatory Guide 4.7 because these areas generally have multiple embedded areas with densities greater than 500 persons per square mile. This limit includes a margin for additional population growth that could occur between the time of siting and plant construction. (EPRI 2022) For this review, U.S. Census block groups with population densities of at least 300 persons per square mile (based on the 2020 Census), along with Census-defined Urban Areas representing population centers, were identified as least suitable for siting. Areas beyond these locations were considered more suitable with respect to population density (see Figure 2.2-6).

2.2.3.4 Land Use Considerations

Land use considerations are based on a new nuclear facility's compatibility with existing land uses. This evaluation focuses on avoiding sensitive land uses in the initial stages of screening candidate areas for nuclear facility siting. In later stages, it considers local issues and site-specific conditions in evaluating candidate and potential sites. The Siting Guide recommends

removing from siting consideration any area dedicated by federal, state, or local government to scenic, recreational, or cultural purposes (EPRI 2022). Siting a commercial nuclear facility near any such public area could cause the loss or deterioration of important public resources and would require extensive evaluation and justification. For this review, the Protected Areas Database of the United States and data from the U.S. Fish and Wildlife Service (USFWS) were used to identify dedicated federal and state lands, military installations, and critical habitat areas, which represent incompatible land uses for siting a nuclear facility (see Figure 2.2-7).

2.2.3.5 Ecological Considerations

The ecological considerations of constructing and operating a nuclear facility include reviewing the potential impacts on nearby habitats and supporting ecological systems. The ecological systems and biota at potential sites and their environs should be evaluated to determine whether constructing or operating a commercial nuclear plant would have any unacceptable or unnecessary deleterious impacts on populations of important species or their ecological systems. Regulatory Guide 4.7 defines an “important species” as an animal or plant species for which a specific causal link can be identified between a nuclear power plant and the species, provided one or more of the following criteria apply (NRC 2024a):

1. The species is commercially or recreationally valuable.
2. The species is endangered or threatened.
3. The species affects the well-being of some important species under criterion (1) or (2), is critical to the structure and function of a valuable ecological system, or is a biological indicator of radionuclides in the environment.

In accordance with the Endangered Species Act, a proposed site should not jeopardize the continued existence of the designated critical habitat of any threatened or endangered species. “Critical habitats” are areas designated by the USFWS or the National Oceanic and Atmospheric Administration Fisheries for the survival and recovery of species listed as threatened or endangered under the Endangered Species Act. Habitat areas of particular concern (including those used seasonally) include breeding and nursing, nesting and spawning, wintering, and feeding areas. (EPRI 2022) Designated critical habitat areas represent exclusionary criteria when screening suitable sites. Figure 2.2-8 includes designated critical habitat areas as part of designated land uses. (USFWS 2015)

There are 21 endangered or threatened species in Oklahoma, including 18 federally listed species (9 endangered, 9 threatened) and 3 state-listed species (2 endangered, 1 threatened). (ODWC 2025) Figure 2.2-8 depicts the spatial range for USFWS-identified threatened and endangered species believed or known to occur in Oklahoma (USFWS 2015). A further evaluation of potential impacts on threatened and endangered species would occur during site suitability screening, including potential impacts on aquatic and terrestrial species and their associated habitats due to the construction or operation of a nuclear plant.

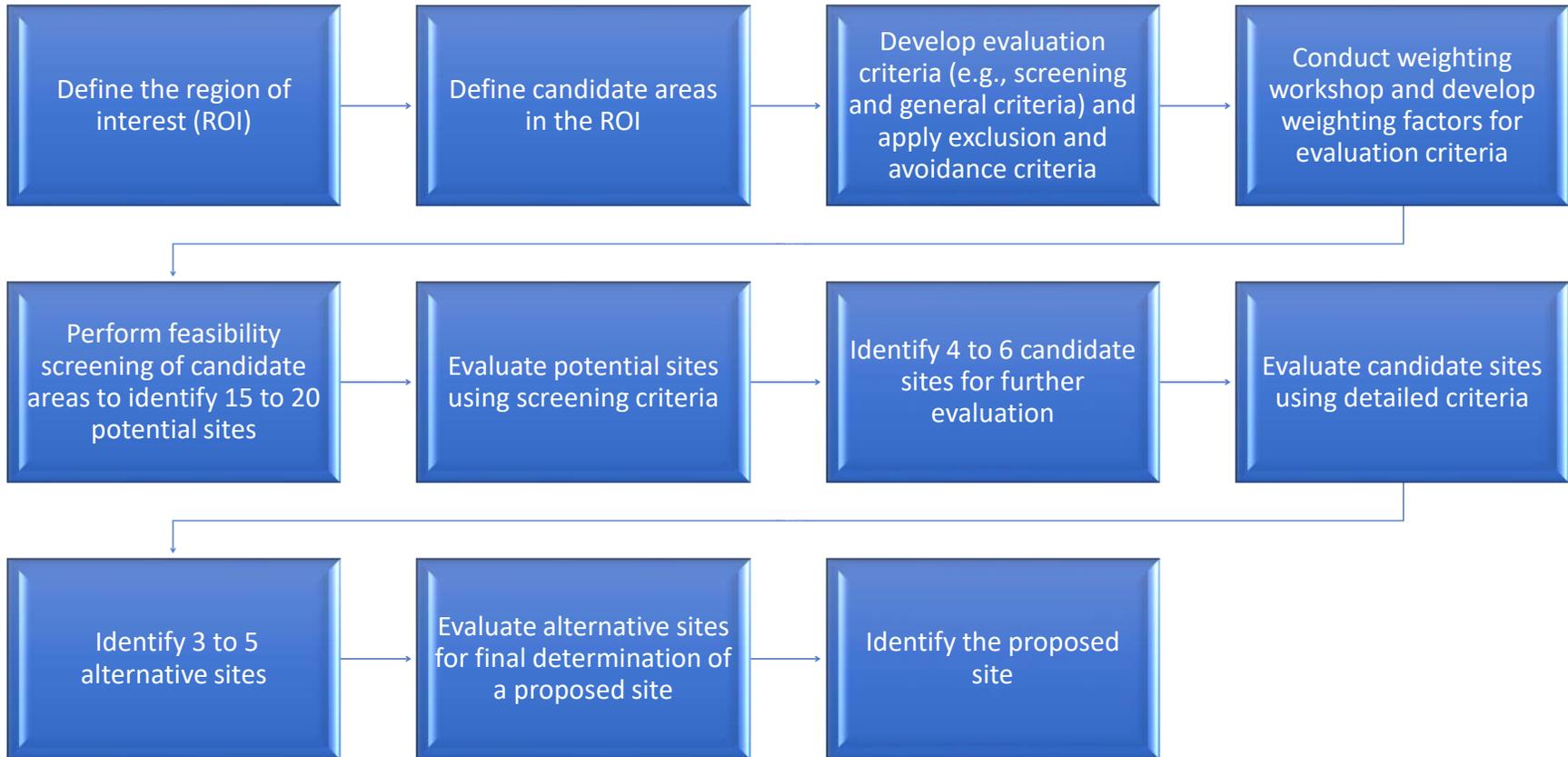
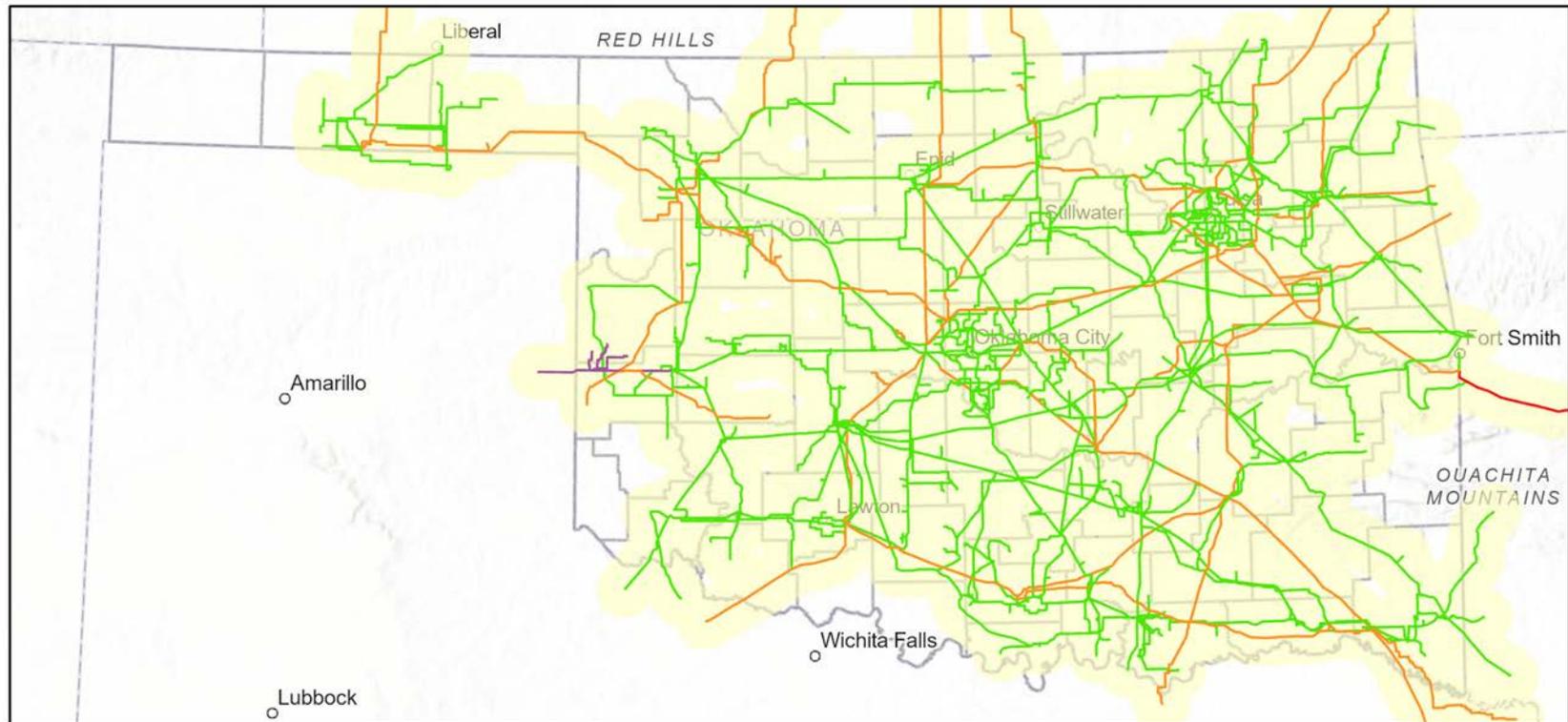


Figure 2.2-1 EPRI Siting Process Example



Legend

- 100-161 kV
- 500 kV
- 220-287 kV
- 10-Mile Buffer
- 345 kV

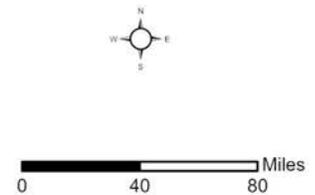
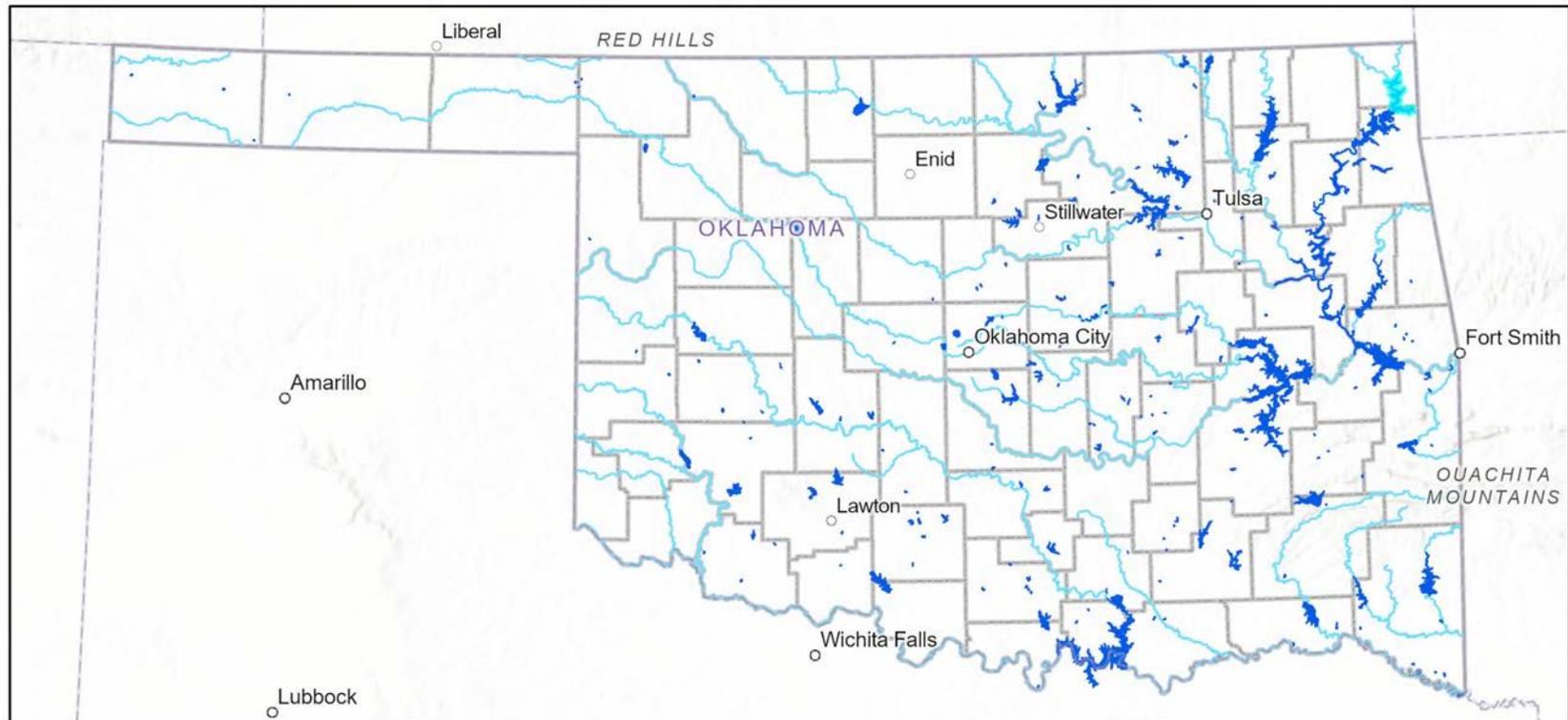


Figure 2.2-2 Transmission Considerations

(ESRI 2024)



Legend

- Major Streams
- Major Lakes

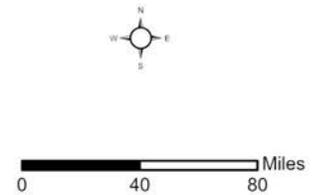
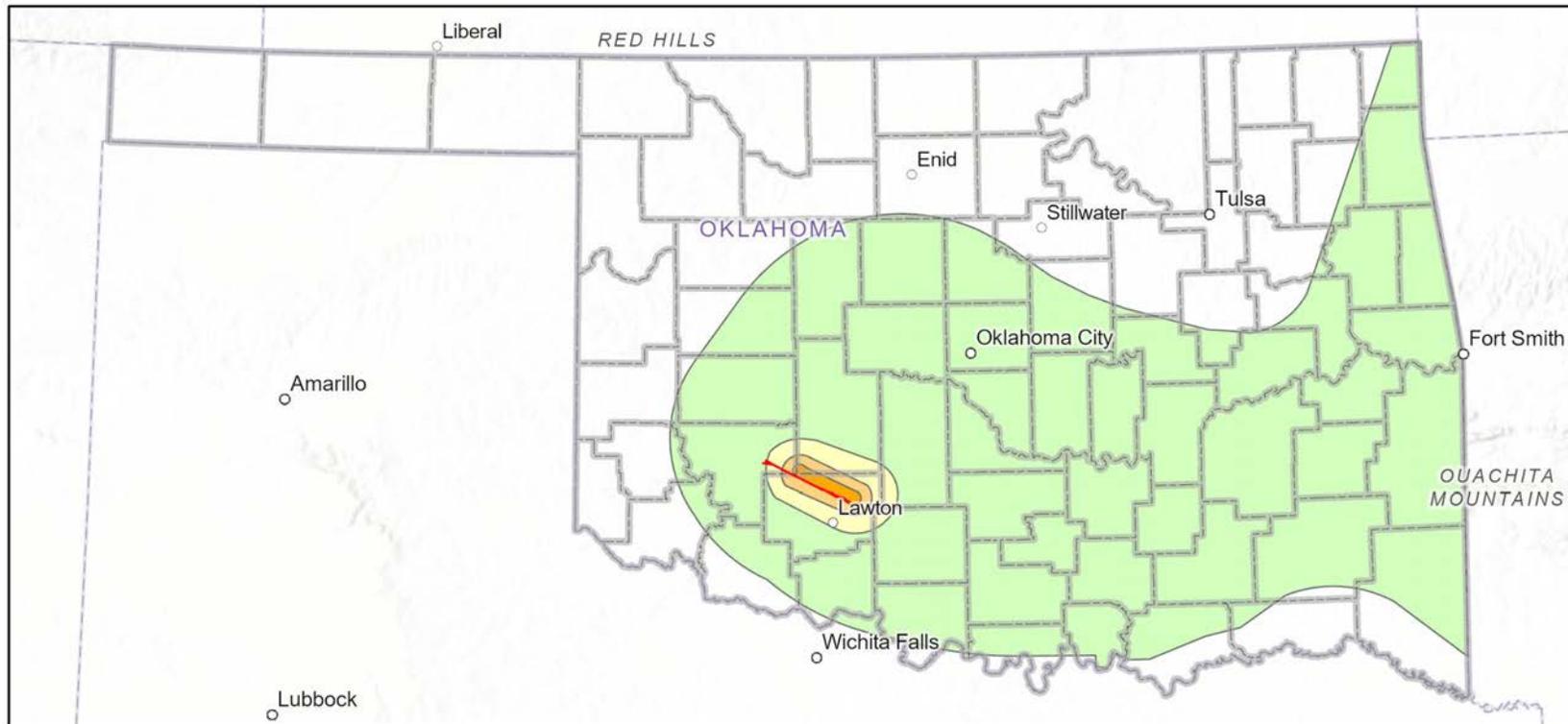


Figure 2.2-3 Water Sources and Availability Considerations

(OWRB 2025)



Legend

- Meers Fault
- SDC B
- SDC C
- SDC D0
- SDC D1

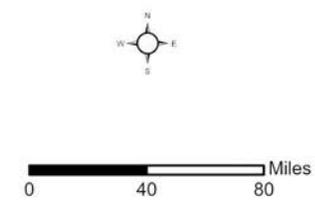
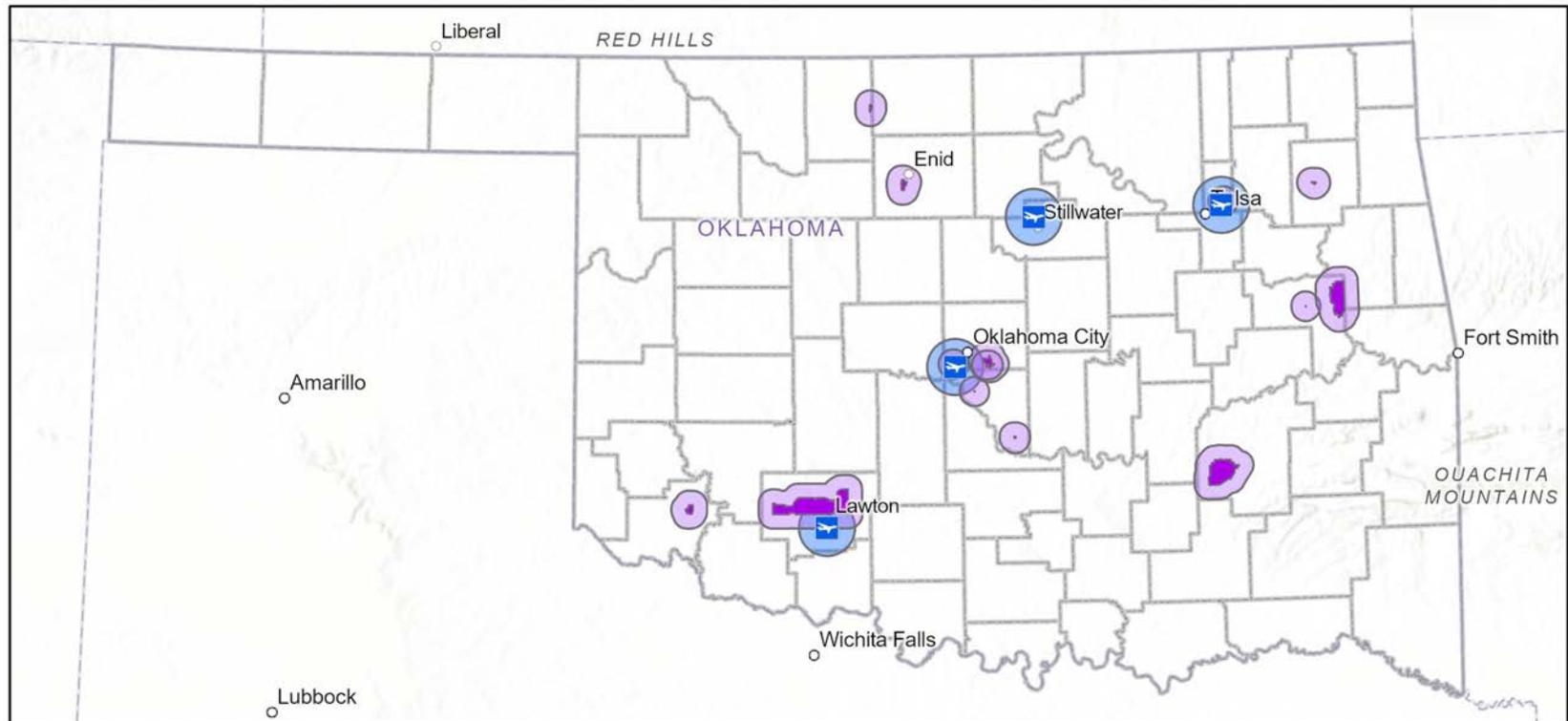


Figure 2.2-4 Seismic Considerations

(FEMA 2025; USGS 2025)



Legend

-  Major Airport
-  Military Installation
-  5-Mile Airport Buffer
-  10-Mile Military Installation Buffer
-  County

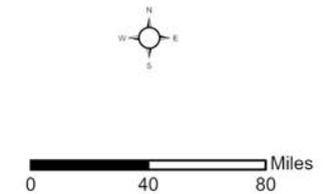
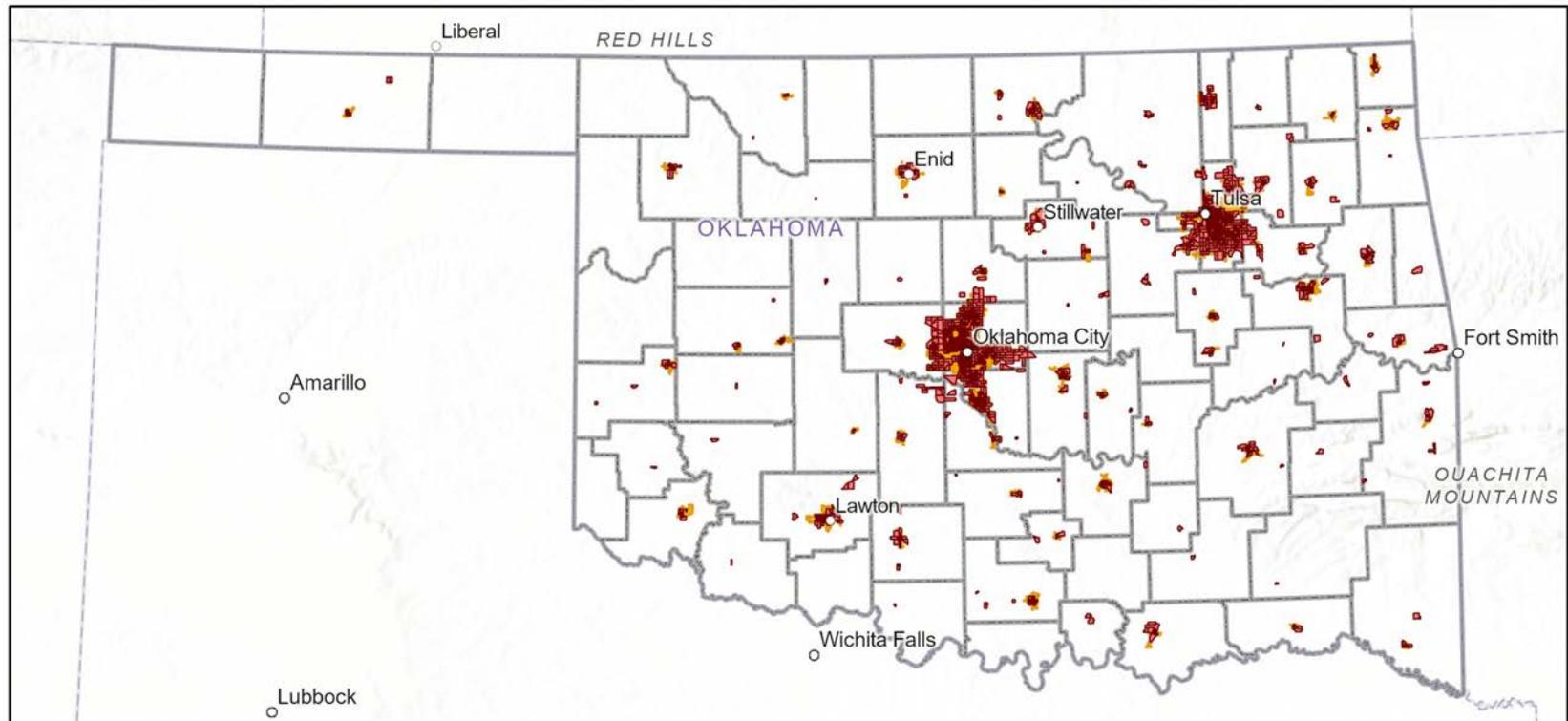


Figure 2.2-5 Hazardous Land Use Considerations

(USDA 2025; USDOT 2025)

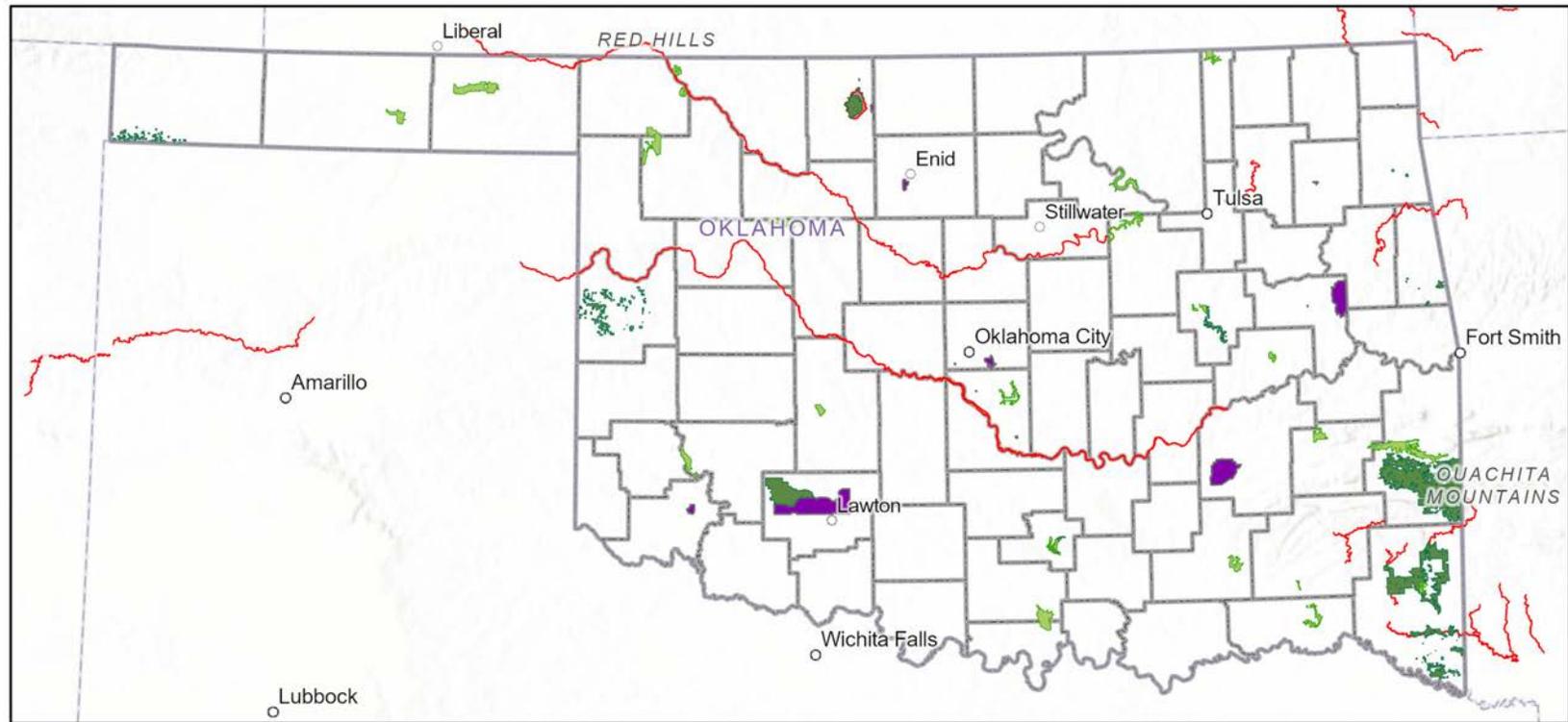


Legend

- U.S. Census Block Group (>300 persons-per-square-mile)
- U.S. Census Urban Areas
- County



Figure 2.2-6 Population Considerations
(ESRI 2025)



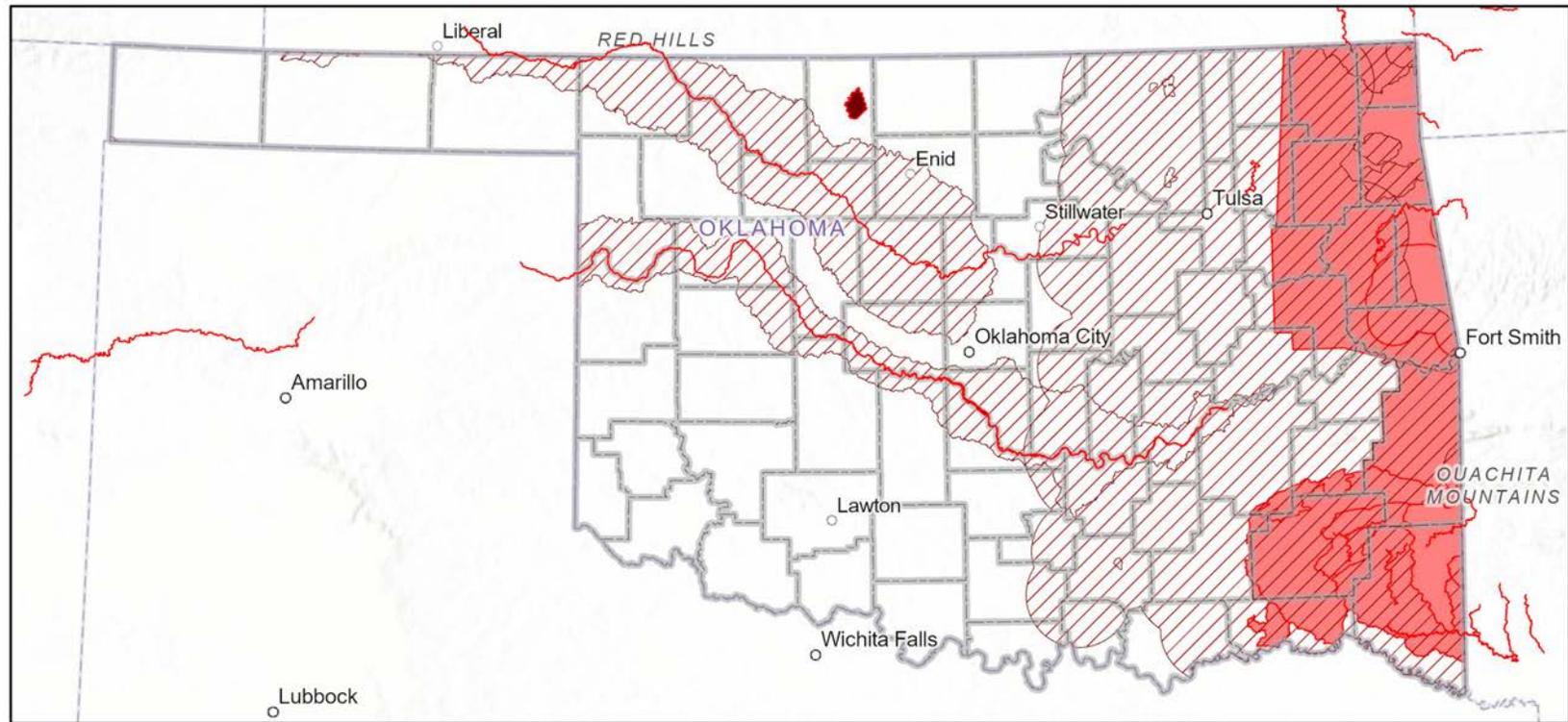
Legend

- Federal Land
- State Land
- Military Installation
- County
- Critical Habitat



Figure 2.2-7 Land Use Considerations

(USDA 2025; USFWS 2015)



Legend

-  Critical Habitat (Exclusion)
-  Endangered Species Spatial Range
-  Threatened Species Spatial Range
-  County



Figure 2.2-8 Threatened and Endangered Species Map

(USFWS 2015)

2.3 Nuclear Facility Licensing Overview

Nuclear reactors within the United States are often categorized into two primary groups: non-power reactors and power reactors. Non-power reactors are licensed and operated by academic groups, government organizations, or commercial entities for training, medical applications, research, or testing. Power reactors are licensed and operated to produce power, and potentially heat, for industrial or commercial purposes. Licensing regulations for both power (e.g., Class 103 license) and non-power (e.g., Class 104 license) reactors are defined in 10 CFR Part 50, which was congressionally authorized in the AEA. Both licensing pathways adhere to the same regulatory standard for safety and public health. The environmental reviews for these licensing pathways are informed by NEPA and other state and federal environmental regulatory considerations. (NIA 2024) The NRC is the primary federal agency responsible for licensing and regulating commercial nuclear power plants. Section 2.3.2 describes the federal licensing process and agreements with partnering agencies.

The licensed and operating fleet of 94 nuclear power reactors in the United States currently generates 43 percent of the nation’s carbon-free electricity. These reactors are located in 28 states, as listed in Table 2.3-1. (NRC 2025c)

2.3.1 Federal Licensing and Regulatory Oversight

The NRC is the leading regulatory agency responsible for licensing commercial nuclear power plants. It was established by the Energy Reorganization Act of 1974 to ensure public health, safety, and environmental protection. NRC authority comes from the AEA of 1954, which requires any entity operating a nuclear reactor to obtain a federal license. The NRC has memorandums of understanding and agreements with several other federal agencies (including the U.S. Army Corps of Engineers, EPA, and National Oceanic and Atmospheric Agency Fisheries) to support the review of licensing applications and ensure compliance with appropriate statutes and regulations and protection of sensitive resources. It is important to note that the NRC continues to review and revise its licensing processes to improve efficiency and meet executive orders. As such, periodic changes to rules and regulations occur. The discussion below provides an overview of the NRC’s licensing process as it is currently defined; however, regulatory and process changes are anticipated in 2026.

There are currently two pathways for licensing commercial nuclear facilities in the United States. The first is a two-step licensing process defined in 10 CFR 50. This process requires both a construction permit and an operating license. The second pathway, defined in 1989 under 10 CFR 52, resulted from the NRC’s work to improve regulatory efficiency and add greater predictability to the licensing process. Part 52 offers a single combined license that provides a construction permit and an operating license with conditions for plant operation.

All nuclear power plant applications must undergo NRC reviews for safety, environmental impacts, and antitrust considerations. The safety review focuses on the licensing application’s

Safety Analysis Report to determine whether the plant design meets all applicable requirements [10 CFR Parts 20, 50, 73, and 100]. The review includes, in part:

- Site characteristics (e.g., population, seismology, meteorology, geology, and hydrology);
- Design of the proposed nuclear plant;
- The proposed plant's anticipated response to hypothetical accidents;
- Plant operations, including the applicant's technical qualifications to operate the plant;
- Discharges from the plant into the environment (i.e., radiological effluents); and
- Emergency plans (NRC 2020).

The NRC summarizes its review in a Safety Evaluation Report, which assesses the proposed facility's anticipated impact on public health and safety. The Advisory Committee on Reactor Safeguards is an independent group that advises the five-member NRC on reactor safety and reviews each application for constructing or operating a nuclear power plant. The Advisory Committee on Reactor Safeguards begins its review early in the licensing process and, when completed, submits the results in a report to the NRC via a letter addressed to the NRC Chairman.

In compliance with NEPA, the NRC reviews and evaluates the potential environmental impacts and benefits of the proposed plant based on the application's environmental report. This document provides information that characterizes the key environmental conditions of the proposed property, the 6-mile vicinity, and the 50-mile region. The report also provides information on key environmental resource areas, including surface water and groundwater, air quality and meteorology, land use, socioeconomics, cultural resources, terrestrial and aquatic ecology, and geology. A review of potential cumulative environmental effects is also included. The NRC completes required consultations with applicable state and federal agencies and Native American tribes. The NRC summarizes this review in a published Draft Environmental Impact Statement or Environmental Assessment for comment by the appropriate federal, state, and local agencies, as well as by the public.

Once all comments have been received and addressed, the NRC issues a Final Environmental Impact Statement or Environmental Assessment. All correspondence and documents associated with a licensing application are stored in the NRC's Agencywide Documents Access and Management System and made available in the NRC Public Document Room in Rockville, Maryland. The NRC also publishes a notice of receipt of the application in the Federal Register. (NRC 2020)

The NRC maintains oversight of the construction and operation of a facility throughout its lifetime to ensure that the plant complies with agency regulations for the protection of public health and safety, the common defense and security, and the environment (NRC 2020).

2.3.2 Typical State Permits and Certifications

Typical state environmental permits that may be required for a nuclear power facility include the following:

- Discharge to Surface Water Permit
- Air Quality Emissions Permit
- Hazardous Waste Permit

The DEQ provides permit assistance to any entity that may require these permits to operate in the state of Oklahoma. While the DEQ is the primary regulatory agency issuing the permits listed above, additional water use permits issued by the OWRB may be required if stream water or groundwater is used in the operation of the nuclear power facility.

2.3.2.1 Discharge to Surface Water Permits

Discharges of stormwater associated with industrial or construction activity to waters of the state are prohibited except as authorized by an individual Oklahoma Pollutant Discharge Elimination System Permit or an authorization under an Oklahoma General Stormwater Permit [OAC 252:606-5-5].

2.3.2.1.1 *OKR10 General Permit for Stormwater Discharges Associated with Construction Activities*

Permit coverage is required for operators of construction activities that disturb 1 acre or more of land or that disturb less than 1 acre of land if it belongs to a larger common plan of development or sale that ultimately will disturb 1 or more acres of land.

2.3.2.1.2 *OKR05 Multi-Sector General Permit for Stormwater Discharges from Industrial Activity*

Permit coverage is required for facilities in the sectors of industrial activities listed in Table 1-3 of the permit, based on Standard Industrial Classification Codes and Industrial Activity Codes. Nuclear power generation falls under Sector O, Steam Electric Generating Facilities: steam electric power generation using coal, natural gas, oil, or nuclear energy to produce a steam source, including coal-handling areas (does not include geothermal power).

2.3.2.1.3 *Oklahoma Pollution Elimination Discharge System*

Point source discharge of industrial waste to surface water requires a permit. There are regulatory requirements for both non-radiological wastewater and for radioactive materials and radioactivity in wastewater discharges to waters designated as public and private water supplies. [OAC 252:606-1-1; OAC 252:730-5-10(2); OAC 252:730-7-4(6)]

2.3.2.2 Air Quality Emissions Permit

Air emissions associated with nuclear power facilities could include those from backup generators, boilers, and other energy sources and may require permits. A permit is required for a major source, defined in part as a source that has the potential to emit 100 tons per year or more of criteria pollutants, 25 tons per year or more of hazardous air pollutants, or 10 tons per year or more of any single hazardous air pollutant. Major sources require both construction and operation permits. [OAC 252:1008-4]

If the facility is determined to be a minor source, defined in part as a source that has the potential to emit less than 100 tons per year of a criteria pollutant, less than 10 tons per year of any single hazardous air pollutant, and less than 25 tons per year of total hazardous air pollutants in the aggregate, then a general permit is required [OAC 252:7-15]. Radiological emissions would require a different permit, but NRC requirements for treating gaseous emissions prior to release likely would negate the need for this type of permit.

2.3.2.3 Hazardous Waste Permit

A facility that stores hazardous waste longer than 90 days is required to obtain a hazardous waste storage permit. If hazardous waste is stored for less than 90 days, the facility is required to notify the EPA of its status as a generator of hazardous waste, depending on the quantity generated in a year. [OAC 252:205 Subchapter 3]

2.3.2.4 Water Use Permits

Nuclear power facilities require water to operate. The OWRB issues water use permits in Oklahoma for stream water and for groundwater [OAC 785:20 et seq.; OAC 785:30 et seq.].

Table 2.3-1 Operating Nuclear Plants in the United States (Sheet 1 of 2)

Plant Name	Reactor Type	State	Owner/Operator
Arkansas Nuclear 1 & 2	PWR	Arkansas	Entergy Nuclear Operations, Inc.
Beaver Valley 1 & 2	PWR	Pennsylvania	Vistra Corporation
Braidwood 1 & 2	PWR	Illinois	Constellation Energy Generation, LLC
Browns Ferry 1, 2, & 3	BWR	Alabama	Tennessee Valley Authority
Brunswick 1 & 2	BWR	North Carolina	Duke Energy Progress, LLC
Byron 1 & 2	PWR	Illinois	Constellation Energy Generation, LLC
Callaway	PWR	Missouri	Ameren UE
Calvert Cliffs 1 & 2	PWR	Maryland	Constellation Energy Generation, LLC
Catawba 1 & 2	PWR	North Carolina	Duke Energy Carolinas
Clinton	BWR	Illinois	Constellation Energy Generation, LLC
Columbia Generating Station	BWR	Washington	Energy Northwest
Comanche Peak 1 & 2	PWR	Texas	Vistra Operations Company, LLC
Cooper	BWR	Nebraska	Nebraska Public Power District
D.C. Cook 1 & 2	PWR	Michigan	Indiana/Michigan Power Co.
Davis-Besse	PWR	Ohio	Energy Harbor Nuclear Corp.
Diablo Canyon 1 & 2	PWR	California	Pacific Gas & Electric Co.
Dresden 2 & 3	BWR	Illinois	Constellation Energy Generation, LLC
Farley 1 & 2	PWR	Alabama	Southern Nuclear Operating Co.
Fermi 2	BWR	Ohio	DTE Electric Company
FitzPatrick	BWR	New York	Constellation Energy Generation, LLC
Ginna	PWR	New York	Constellation Energy Generation, LLC
Grand Gulf 1	BWR	Mississippi	Entergy Nuclear Operations, Inc.
Hatch 1 & 2	BWR	Georgia	Southern Nuclear Operating Co., Inc.
Hope Creek 1	BWR	Delaware	PSEG Nuclear, LLC
La Salle 1 & 2	BWR	Illinois	Constellation Energy Generation, LLC
Limerick 1 & 2	BWR	Pennsylvania	Constellation Energy Generation, LLC
McGuire 1 & 2	PWR	North Carolina	Duke Energy Carolinas, LLC
Millstone 2 & 3	PWR	Connecticut	Dominion Generation

Table 2.3-1 Operating Nuclear Plants in the United States (Sheet 2 of 2)

Plant Name	Reactor Type	State	Owner/Operator
Monticello	BWR	Minnesota	Northern States Power Company – Minnesota
Nine Mile Point 1 & 2	BWR	New York	Constellation Energy Generation, LLC
North Anna 1 & 2	PWR	Virginia	Dominion Generation
Oconee 1, 2 & 3	PWR	South Carolina	Duke Energy Carolinas, LLC
Palisades	PWR	Michigan	Holtec Palisades, LLC
Palo Verde 1, 2 & 3	PWR	Arizona	Arizona Public Service Co.
Peach Bottom 2 & 3	BWR	Pennsylvania	Constellation Energy Generation, LLC
Perry 1	BWR	Ohio	FirstEnergy Nuclear Operating Co.
Point Beach 1 & 2	PWR	Wisconsin	NextEra Energy Point Beach, LLC
Prairie Island 1 & 2	PWR	Minnesota	Northern States Power Company – Minnesota
Quad Cities 1 & 2	BWR	Illinois	Constellation Energy Generation, LLC
River Bend 1	BWR	Louisiana	Entergy Nuclear Operations, Inc.
Robinson 2	PWR	South Carolina	Duke Energy Progress, LLC
Saint Lucie 1 & 2	PWR	Florida	Florida Power & Light Co.
Salem 1 & 2	PWR	Delaware	PSEG Nuclear, LLC
Seabrook 1	PWR	New Hampshire	NextEra Energy Seabrook, LLC
Sequoyah 1 & 2	PWR	Tennessee	Tennessee Valley Authority
Shearon Harris 1	PWR	North Carolina	Duke Energy Progress, LLC
South Texas 1 & 2	PWR	Texas	STP Nuclear Operating Co.
Summer	PWR	South Carolina	South Carolina Electric & Gas Co.
Surry 1 & 2	PWR	Virginia	Dominion Generation
Susquehanna 1 & 2	BWR	Pennsylvania	Susquehanna Nuclear, LLC
Turkey Point 3 & 4	PWR	Florida	Florida Power & Light Co.
Vogtle 1, 2, 3, & 4	PWR	Georgia	Southern Nuclear Operating Co.
Waterford 3	PWR	Louisiana	Entergy Nuclear Operations, Inc.
Watts Bar 1 & 2	PWR	Tennessee	Tennessee Valley Authority
Wolf Creek 1	PWR	Kansas	Wolf Creek Nuclear Operating Corp.

(NRC 2025c)

3.0 ECONOMIC CONSIDERATIONS

3.1 Benefits

3.1.1 Economic Development and Tax Base

Economic development from new reactors results from construction-related expenditures and the in-migrating workforce and their families. Economic benefits due to new reactor construction include employment, economic output, local labor income, and additional tax revenue from sales and property taxes. Economic benefits will be distributed in the host county and a grouping of surrounding counties where the workforce and their families find residency, called an economic region. (NRC 2024b)

Geographically, an economic region typically represents the surrounding area within 50 miles of a nuclear power generating facility. The in-migration of construction and operations workers to the economic region affects the economy through the creation of new jobs and the increase in goods and services purchased. The economic model typically used to identify these effects is the regional input-output modeling system (RIMS II). This model is based on benchmark national input/output multipliers and incorporates buying and selling linkages among regional industries to create multipliers for both jobs and monetary expenditures. As an example, building a new road will lead to the increased production of asphalt and concrete, which will lead to more mining. Workers benefiting from these increases may spend more on services and personal items. (BEA 2023)

For example, if an SMR project requires a peak number of 2,500 construction workers, an estimated 70 percent (1,750 workers) will come from outside the region. Those 1,750 workers will have an impact on the economic region. This assumes that people living in the region are already impacting the region economically. A RIMS II multiplier value of 0.9423 would mean that, for every new worker in the economic region, 0.9423 full- and part-time jobs are created. Thus, the addition of 1,750 new workers results in 1,649 indirect jobs, for a total of 3,399 jobs. Because most indirect jobs are service related and not highly specialized, it is assumed that most, if not all, indirect jobs are filled by the existing workforce within the 50-mile region. Actual values for the expected construction and operations workforce, as well as the RIMS II multipliers, will vary based on the project's size, planning, and location. A larger project would be expected to have a larger workforce than a smaller project. A project with an accelerated schedule would be expected to have a larger workforce. The RIMS II multipliers can vary based on the economic conditions of the areas where the projects are located.

Some or all of the indirect jobs created by the workforce are expected to be filled by unemployed workers in these counties. The money spent locally by these new workers, their families, and the newly employed persons in each county adds to the region's economy.

Annual construction labor and material expenditures for the construction period are expected to be millions of dollars per year. The majority of annual spending would occur in the region, with portions of those funds being spent outside the region. Depending on its specific needs, a typical reactor project would include the construction of safety-related facilities, such as the nuclear island, and non-safety-related facilities, such as cooling towers, administration buildings, parking lots, switchyards, and any onsite and offsite pipelines, access roads, and transmission lines. Reactors can be located such that some facilities are already present or not needed for the project. (NRC 2024b)

When comparing the influx of construction workers with the relatively small population of the vicinity (within 6 miles), the increase in expenditures and benefits is significant. When comparing the influx of construction workers with the larger population of the region, the increase in expenditures and benefits is proportionally smaller. Expenditures and benefits include the creation of jobs, employee purchasing, and increased tax revenues. (NRC 2024b)

The added value of the property where the reactor is built is expected to result in increased property taxes paid to the local government. In many cases, taxes paid to the local government due to an operating reactor are a large percentage of the local government's income over the life of the reactor. Recent operating power reactor license renewals can provide insight into the percentage of taxes provided by operating reactors. For example, Constellation Energy paid 10.1 to 14.7 percent of the total property taxes for Grundy County, Illinois, from 2018 to 2022 for the Dresden Nuclear Power Station (NRC 2025d, NUREG-1437 supp 17). Comanche Peak property taxes represent between 58 and 75 percent of the total revenue for Somervell County, Texas, tax jurisdictions (NRC 2024c).

The initial license of a reactor is 40 years, which can be extended in 20-year increments up to two times, resulting in an 80-year total operating life or longer. This results in relatively stable and substantial tax revenue for local governments over many years of operation. A reactor operator can make improvements by adding new reactor units, which would add value to the property, increase economic output, provide jobs, and increase tax revenue.

Other benefits to the vicinity of the new reactor can include funding, training, and collaboration with surrounding emergency services as well as charitable giving.

3.1.2 Employment and Workforce

3.1.2.1 Executive Overview

The deployment of SMR technology and the increased use of traditional nuclear LWRs represent an economic opportunity for Oklahoma distinct from previous eras of energy development. Traditional GW -scale LWRs, like the Vogtle 3 and 4 plant expansions, are massive, complicated projects that could take 10 to 20 years to finish (the deployment schedule is expected to shorten over time). While the project created a lot of work—supporting about

37,900 total jobs and peaking at 9,000 onsite workers—the jobs were mostly temporary on the construction side.

The SMR model is based on more factory-based modular manufacturing than traditional GW-scale LWRs, long-term supply chain integration, and high-precision operations, resulting in a reliance on economies of mass production. This shifts some of the temporary construction site jobs to permanent factory floor jobs.

The central finding of this workforce analysis is that Oklahoma has the potential to adapt portions of its existing workforce to support nuclear power. While the state currently lacks an operating commercial nuclear power plant—and, therefore, the immediate inventory of licensed Senior Reactor Operators—it compensates with a high density of transferable skills. The state’s manufacturing sector (employing over 142,000 workers as of mid-2025) and energy sector (employing approximately 48,000 workers) provide a robust foundation for this transition. (BLS 2025; SWL 2025)

This section provides an examination of the labor ecosystem required to support an SMR industry. It breaks down the workforce demand across three critical phases: (1) the high-value manufacturing supply chain, (2) the specialized construction and assembly phase, and (3) the long-term operations and maintenance phase.

3.1.2.2 Oklahoma Workforce Within the National Context

To understand Oklahoma’s specific position, one must contextualize the current state of the national nuclear workforce. The U.S. nuclear energy sector is expecting a mass retirement trend in the next 20 years. The DOE’s U.S. Energy and Employment Report notes that the nuclear workforce is older than the average energy workforce, with 60 percent of workers aged 30 to 54 and a shrinking pool of workers under 30 (DOE 2024b).

This demographic shift coincides with the rapid commercialization of SMRs and a general power generation expansion, creating a “double demand” shock. The DOE projects that the industry will require approximately 375,000 new workers by 2050 to support the deployment of advanced reactors (DOE 2024c).

For Oklahoma, this national shortage is a potential opportunity. States with existing large nuclear fleets are struggling to replace their own retiring workers. Oklahoma, by contrast, has a strong pool of technical talent in adjacent sectors—specifically, fossil fuel generation and aerospace manufacturing—that can be retrained to support this opportunity. A challenge here is that Oklahoma has low unemployment rates; combined with the competition for skilled workers from the energy and aerospace industries, this requires the development of a larger workforce. This challenge exists even without the potential of new jobs in the nuclear energy industry.

3.1.2.3 SMR-Specific Workforce Demand

The SMR workforce model differs fundamentally from the large LWR model. The economic viability of SMRs rests on economies of mass production, shifting the center of gravity for some of the employment opportunities from the construction site to the factory floor. This model difference also has an impact on the operation and maintenance of power generation facilities.

3.1.2.3.1 *The Manufacturing-Centric Employment Model*

In the SMR ecosystem, the reactor pressure vessel, containment structure, and steam generators are manufactured in a central facility and shipped to the site. This creates a high demand for a permanent, geographically stable manufacturing workforce. In contrast, a large LWR project—specifically, Vogtle Units 3 and 4 (2,204 MW capacity)—will provide 800 permanent direct jobs to the local community once operational. This staffing level is high due to safety, security, and regulatory compliance requirements.

3.1.2.3.2 *Key Occupational Categories in Manufacturing*

The following job examples are applicable to Oklahoma’s workforce:

- **Nuclear-Grade Welders:** The welding requirements for SMR modules are among the most stringent in any industry (American Society of Mechanical Engineers [ASME] Section III). While Oklahoma has 9,780 welders, most are certified under American Petroleum Institute (API) Standard 1104 (pipeline welding) (OESC 2024). Converting these workers to ASME Section IX nuclear standards is the primary training objective.
- **Precision Machinists and Computer Numerical Control Operators:** The fabrication of internal reactor components requires tolerances measured in microns. Oklahoma’s existing precision manufacturing base is well-positioned here.
- **Quality Assurance and Nondestructive Testing Specialists:** Under the Nuclear Quality Assurance (NQA-1) standard, “quality” is the regulatory gatekeeper. Oklahoma currently employs approximately 1,270 Non-Destructive Testing Specialists, a strong baseline driven by the aerospace sector (CE 2025).

Case Study: The BWXT Employment Model

Real-world data from SMR manufacturers validate the scale of this opportunity. BWXT recently announced an expansion of its Cambridge, Ontario, facility to support SMR deployment, creating over 200 long-term jobs for skilled trades and engineers (ANS 2024). This facility demonstrates that SMR manufacturing creates high-wage industrial jobs that are resistant to offshoring.

3.1.2.3.3 *Onsite Construction*

While SMR projects have shorter construction timelines, the intensity of work can remain high. With a reactor size ranging from 2 to 300 MWe, the site prep and installation can vary widely. Micro SMRs up to 50 MWe can be as small as a standard shipping container and deployed on a short-term basis for behind-the-meter applications. Larger SMR grid-supporting site installations have requirements greater than those of a combined-cycle gas turbine.

- **Projected Numbers:** Comparative analysis from the Tennessee Valley Authority for the Clinch River SMR (300 MWe) project estimates a peak construction workforce of 1,200 to 1,500 workers (TNEAC 2023). Other studies suggest that peak employment could reach 1,800 workers during the mechanical and electrical installation phases (BBR 2025).
- **Civil Works:** Site preparation involves deep excavation and pouring nuclear-grade concrete. This requires heavy equipment operators and concrete finishers familiar with high quality control requirements.

3.1.2.3.4 *Operational Staffing Models*

Advanced SMR designs utilize passive safety features that reduce the need for active operator intervention in addition to offering the following benefits:

- **Leaner Operations:** NuScale Power successfully argued for a staffing plan allowing a minimum of three licensed operators to control up to 12 reactor modules from a single control room (NEI 2021).
- **Aggregate Headcount:** Despite reductions per MW, a fully operational SMR site (e.g., a multi-module plant) will still require 200 to 270 permanent staff (Holtec 2025). These are long-term, stable jobs with an average tenure exceeding 20 years.

3.1.2.3.5 *Comparing the Timelines for LWRs and SMRs*

Figure 3.1-1 provides a graphed representation of workforce timelines, and the examples below are based on large LWR and SMR reactor types:

- **Large LWR (~1,100 MW):** Data are based on the AP1000 units at Plant Vogtle (Units 3 and 4). Each unit has a nameplate capacity of approximately 1,117 MW. The construction workforce peaked at over 9,000 workers onsite, with a timeline extending beyond 10 years from initial site prep to commercial operation.
- **SMR Plant (~462 MW):** The model reflects a representative SMR configuration, such as a NuScale VOYGR-6 plant (6 modules, 77 MW each = ~462 MW). Construction estimates for these modular designs project a 3-to-5-year timeline with a significantly reduced peak workforce of approximately 1,200–1,800 workers due to factory fabrication of components. (BBR 2025)

The large LWR timeline reflects recent Western project realities (Vogtle, Flamanville, Olkiluoto), which historically have faced delays that pushed schedules to a decade or more, whereas SMRs are designed to mitigate this challenge through standardization.

3.1.2.4 Oklahoma's Industrial Base and Workforce Assets

Oklahoma's nuclear feasibility is grounded in the state's existing industrial base. The state possesses solid pillars of workforce capability that can be pivoted toward nuclear energy, as described below.

3.1.2.4.1 *The Energy Sector (Oil and Gas Transferability)*

Oklahoma's oil and gas workforce is its most potent reservoir of transferable talent. The technical disciplines required to extract, refine, and transport hydrocarbons are remarkably like those required for nuclear power generation. See Figure 3.1-2 for a comparative review of existing oil and gas roles, potential nuclear equivalent roles, and technical overlaps and training gaps.

3.1.2.4.2 *The Aerospace Industry (Quality Assurance)*

While the aerospace industry is still growing, and there is a challenge in bringing in newer talent, Oklahoma's aerospace sector (North American Industry Classification System [NAICS] 3364) is anchored by Tinker Air Force Base and Boeing, providing a critical capability: High-Stakes Quality Assurance.

- AS9100 to NQA-1: The aerospace industry operates under AS9100, which shares 80 percent of its DNA with the nuclear NQA-1 standard (NRC 2011). An inspector trained in AS9100 already possesses the "safety culture" mindset required for nuclear work.
- Heat Treating: Aerospace firms in Oklahoma, such as Wall Colmonoy and Southwest United Industries, possess advanced capabilities in heat treating and surface finishing (WC 2025; PCC 2025). These processes are critical for nuclear components that must withstand high radiation and corrosion.

3.1.2.5 Examples of Relevant NAICS Sectors

Overall, Oklahoma possesses a workforce that has a robust foundation and is highly transferable, as seen in some of the following sectors within the state:

- NAICS 237130: Power and Communication Line Construction
- NAICS 332410: Power Boiler and Heat Exchanger Manufacturing
- NAICS 332313: Plate Work Manufacturing

- NAICS 332911: Industrial Valve Manufacturing
- NAICS 541690: Other Scientific and Technical Consulting

The strong background in Balance of Plant construction and high-voltage transmission, gained through wind energy expansion, is very beneficial to the state. Key manufacturers, such as Webco Industries and Boardman, demonstrate existing capabilities in producing pressure tubing and containment vessels, with the primary barrier being regulatory certification rather than technical skill (Webco 2025; Boardman 2025). Additionally, the region offers a solid valve manufacturing base from the oil sector and growing expertise in nuclear licensing, environmental, and design firms.

3.1.2.6 Educational Infrastructure and Talent Pipeline

A sustainable SMR industry requires a permanent pipeline for new graduates. Oklahoma has well-regarded university-level research and engineering programs that are more than capable of supporting the nuclear industry. Though there is currently no established market in the state for dedicated majors, Oklahoma can build upon existing higher education assets to develop programs that promote talent development and future workforce readiness.

Universities, Public and Private Institutions

- Oklahoma State University (OSU): The College of Engineering, Architecture and Technology offers a Minor in Nuclear Engineering. In the 2023–2024 academic year, OSU awarded 237 Electrical Engineering degrees and 93 Aerospace Engineering degrees, providing a deep pool of “nuclear-adjacent” talent (OSU 2024).
- University of Oklahoma: OU excels in High-Energy Physics and Medical Physics (OUHSC 2025). The Gallogly College of Engineering has seen a 45-percent increase in enrollment since 2020, reaching over 4,600 students, indicating a robust pipeline of future engineers (OU 2025).
- University of Tulsa (TU): TU does not have a dedicated nuclear engineering degree program, but it does have energy-related programs that cover nuclear topics within a broader energy context. TU offers programs in related fields, including energy, physics, and engineering physics, which may include coursework on nuclear fusion and related subjects. TU is known for its strong petroleum engineering program and is expanding its curriculum to include sustainable and alternative energy sources, including nuclear energy.

Aside from the three Research I universities listed, the state has more than 30 public and private institutions that offer programs in relevant fields to support growth in Oklahoma’s energy economy.

CareerTech and Technical Training

- Oklahoma State University Institute of Technology (Okmulgee): The Associate of Applied Science degree in Power Plant Technology is a premier feeder for plant operators. The curriculum covers boilers, turbines, and compliance regulations, making graduates nearly “plug-and-play” for non-licensed operator roles. (OSUIT 2025)
- Tulsa Technology Center and Francis Tuttle Technology Center: These centers offer advanced Manufacturing and Nondestructive Testing Specialist programs. Tulsa Tech’s Quality and Inspection Technician program specifically teaches magnetic particle and ultrasonic testing, skills directly applicable to NQA-1 roles (TCC 2025).

Overall, Oklahoma has 29 CareerTech centers with 62 campuses, which had a total enrollment of 517,752 during fiscal year 2025. These centers support approximately 10,604 companies in total.

An example of workforce feasibility is the significant divergence between the API 1104 pipeline welding standards that dominate Oklahoma’s industry and the stricter ASME Section IX standards required for nuclear projects. While the local workforce excels at speed-focused downhill welding, nuclear applications demand the absolute zero-defect tolerance of uphill welding (GG 2011). This distinction represents a manageable training gap rather than a fundamental lack of capability, necessitating the creation of a Nuclear Bridge Certification program to retrain elite API welders for nuclear-grade craftsmanship.

3.1.2.7 Economic Impact and Wage Analysis

Nuclear energy jobs offer a significant wage premium over other energy sectors, providing a compelling retention strategy for Oklahoma’s workforce.

- Wage Analysis: As shown in Figure 3.1-3, nuclear operators and technicians command higher salaries than their counterparts in wind and general manufacturing. This “nuclear premium” is a powerful tool for attracting talent.
- Multipliers: Studies indicate that for every 10 direct jobs in the nuclear industry, approximately 28 secondary jobs are created in the local economy—a multiplier significantly higher than in the renewable energy sector (wind/solar) (NEI 2025a).

Figure 3.1-3 depicts a comparison of annual wages for key skilled trades in Oklahoma against the national median for Nuclear Power Reactor Operators.

3.1.2.8 An Example Road Map

Phase 1: Foundation (Years 1–2)

- Supply Chain Certification Grant: Establish a state fund to subsidize 50 percent of the cost for Oklahoma manufacturers to obtain ASME N-Stamp certification.
- “Nuclear Bridge” Welding Program: Partner with CareerTech to launch a conversion course for API 1104 welders to learn ASME Section IX standards.

Phase 2: Acceleration (Years 3–5)

- The “Oklahoma Quality Alliance”: Create a mentorship program where aerospace quality experts (AS9100) train manufacturing suppliers on NQA-1 compliance.
- University Certificates: Introduce “Nuclear Energy Systems” undergraduate certificates at OU and OSU to broaden existing mechanical/electrical degrees.

3.1.2.9 Conclusion

The transition of Oklahoma’s energy workforce to nuclear energy is not only feasible but represents a strategic optimization of the state’s existing energy sector expertise. With over 142,000 manufacturing workers and a deep pool of energy talent, Oklahoma does not need to build a workforce from scratch; it needs to build a bridge for its existing experts into the nuclear regulatory environment. By leveraging the high-quality standards of its aerospace sector and the pipe-and-pressure expertise of its oil and gas sector, Oklahoma can secure its position as a diversified energy leader for the next century.

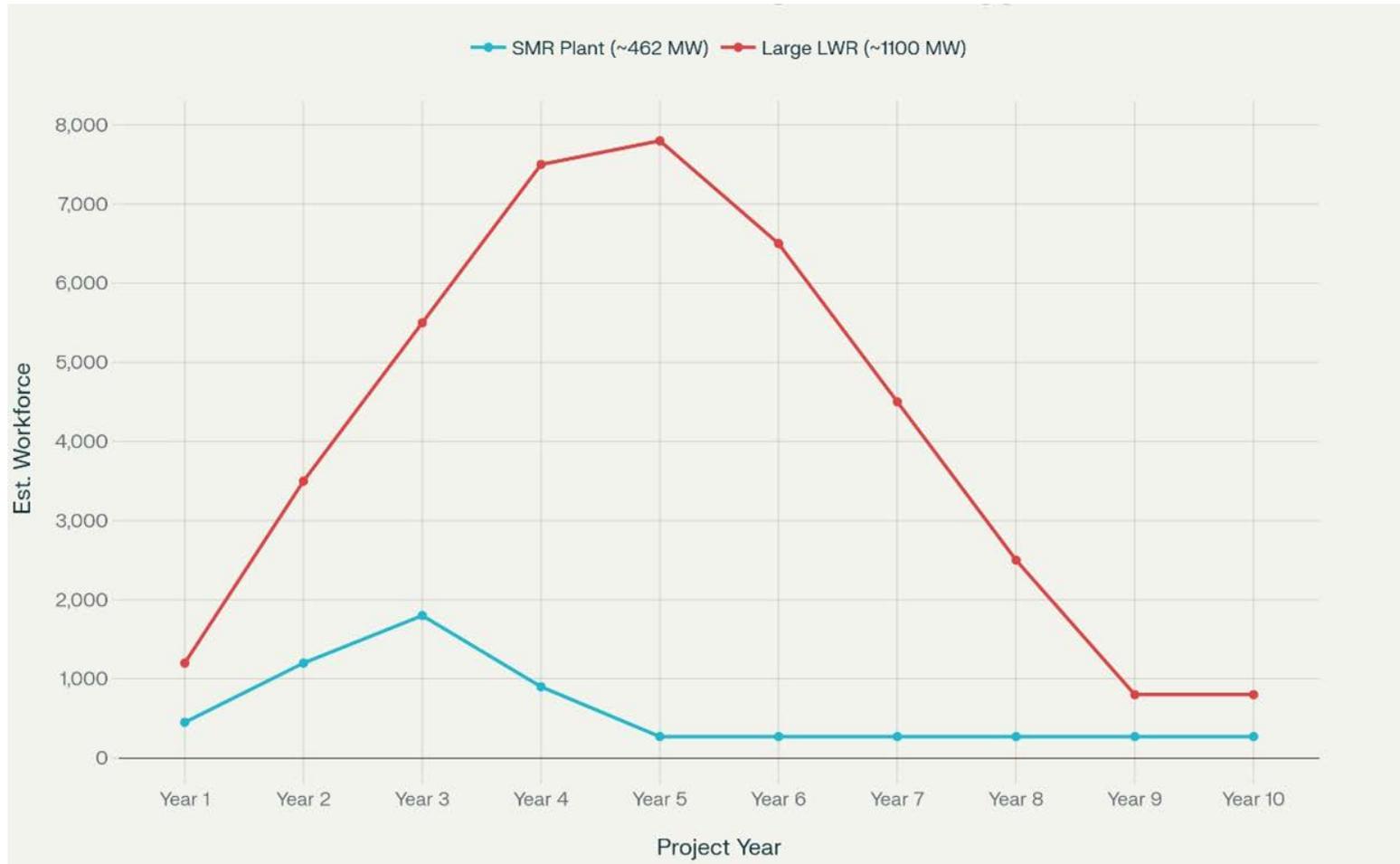


Figure 3.1-1 Workforce Timeline by Reactor Type

Oil & Gas Role	Nuclear Equivalent	Technical Overlap	Training "Delta" (Gap)
Refinery Operator	Non-Licensed Operator (NLO)	Monitoring pressures/temps, valve alignment, procedure adherence.	Radiation worker training, reactor physics fundamentals.
Pipeline Welder (API 1104)	Nuclear Component Welder (ASME IX)	High-integrity welding, confined spaces, blueprint interpretation.	Upgrade to ASME Section III/IX, stricter QC documentation, "uphill" vs "downhill" technique.
Instrumentation Technician	I&C Technician	Sensor calibration, troubleshooting control loops, SCADA.	Nuclear-specific sensors (neutron flux), digital control qualification.
Petroleum Engineer	Systems Engineer	Fluid dynamics, thermodynamics, pressure vessel integrity.	Neutronics, criticality safety, radiological materials science.

Figure 3.1-2 Role Equivalents and Gaps

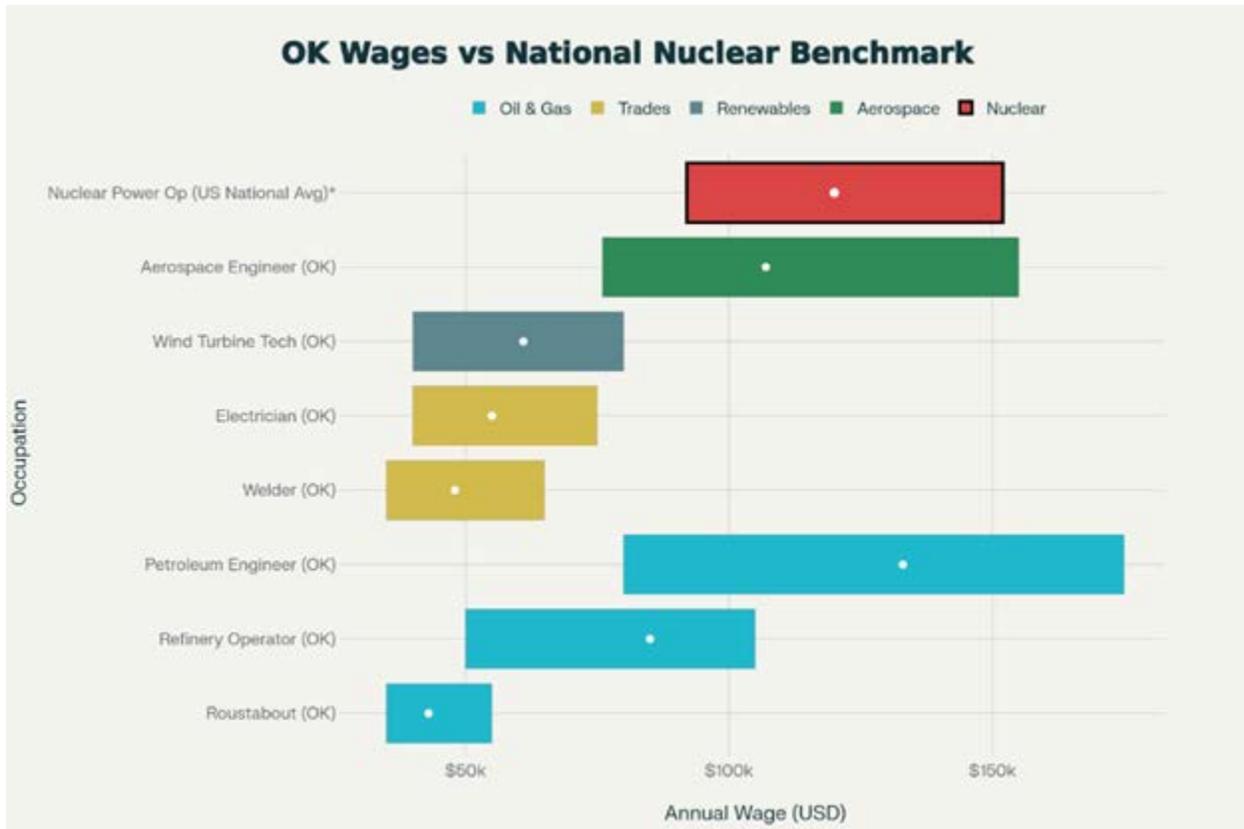


Figure 3.1-3 Oklahoma Wages Versus National Nuclear Benchmark

3.2 Existing Electric Generation Market

Reviewing Oklahoma’s 2024 annual electricity generation data alongside the GridInfo Directory of Power Plants in Oklahoma shows that the state is becoming more dependent on natural gas for reliable, on-demand power and on wind for much of its yearly energy production, while solar and storage remain too small to meaningfully affect overall reliability (EIA 2025; GridInfo 2025).

While the level of energy demand in Oklahoma has been relatively flat in recent history, it is increasing dramatically. Also contributing to changing market dynamics are the retirements of existing energy generation plants. The 2025 GridInfo summary confirms that several coal units contributing to past generation have retired, reduced operations, or are continuing operations after anticipated closings, meaning their historical output can no longer be counted on. New data centers moving into the state, as well as the expansion of electrification for transportation and heavy industrial applications, are bringing very large and steadily increasing electricity needs that put additional pressure on the grid, requiring upgrades to both power plants and transmission lines and reducing the cushion of extra capacity available during high-use times. Taken together, the two datasets show that Oklahoma is losing round-the-clock power sources faster than new ones are being added and that the state will need to consider a mix of future energy options to keep the system reliable, affordable, and capable of supporting both everyday customers and growing economic development. (EIA 2025; GridInfo 2025)

The existing market is exhibiting rapid demand growth and is starting to show signs that such demand could outpace available generation capacity. Further, Oklahoma, with an “all of the above approach,” has been significantly reliant on natural gas and wind to meet market demand. Given the market realities, structural changes are being implemented in response to ever-increasing demand while continuing to seek balance among reliability, affordability, and economic development goals.

An example of a recent structural change is the amendment to 17 O.S. § 286, which mandated an alternative financing mechanism for any new natural-gas-fired electric generation facility constructed pursuant to this law. This provision allows the investor-owned utility (IOU) to start recovering capital costs associated with CWIP expenditures prior to beginning commercial operation of a new generation facility that uses natural gas as its primary fuel source. With this structural change, the IOU will be able to receive funding (from its rate base) for its generation facility long before it goes into commercial operation, thereby making the construction project more financially attractive.

Another structural change being observed across the country—prompted by the efforts to meet increasing demand and the focus on reliable, affordable electricity—is a reconsideration of the role of coal power plants. Utilities in 19 states have reversed or delayed the retirement of 58 coal-fired generating units because of reliability concerns and load growth. Currently, some Oklahoma utilities are grappling with the decision to either delay retirement or convert a coal-fired facility to a gas-fired facility (AP 2025).

3.3 First-of-a-Kind Projects and Rate-Recovery Considerations

The development of SMR design is ongoing, with no clear preference or advantage among the various technologies being developed. There are several reactor types being developed, including PWRs, high-temperature gas-cooled reactors, molten salt reactors, and liquid metal fast reactors. The wide range of technologies and reactor types and the current lack of a clear preferred standard suggests that the costs associated with FOAK projects will continue to require significant capital investments.

These significant capital requirements and the associated timelines for construction, which are anticipated to be in the 3-to-5-year range, point toward a variety of factors that put upward pressure on costs. Notable among these is the investment risk. In considering financing alternatives for the establishment of SMRs in Oklahoma, it would be prudent to consider the existing regulatory requirements when such financing alternatives would involve the transfer of some or all of the investment risk to the rate base of an IOU.

The OCC must approve any IOU's request to invest in a new generation source, regardless of the type of generation, to be included in its rate base. In performing its review of such a request, the OCC considers a variety of factors, including whether the investment is prudent (particularly given available alternatives) and in the public interest or requires supplemental generation (and, if so, whether the request represents the most cost-effective way to meet that need).

Relying on the rate base for cost recovery in establishing an SMR in Oklahoma by an IOU may appeal to investors as insulating them from the risk and expense. However, the IOU's customers may not support becoming guarantors of these costs and facing higher rates as a result. The IOU may favor this approach because, if ordered by the OCC, it could earn a return on its capital investment as costs are incurred. Lastly, reliance on the rate base to recover the costs of a new generation source must comply with the OCC's legal and regulatory requirements, including undergoing a competitive RFP process and demonstrating that the investment is a reasonable choice among available alternatives. This means that the costs of nuclear generation must be at least as reasonable, if not more so, as those of alternatives such as natural gas.

Because of current review requirements and the costs and investments associated with nuclear development, it likely will be challenging to identify a FOAK nuclear generation project that would represent a more reasonable investment than natural gas or another alternative source, particularly when 17 O.S. § 286(C)(6) provides favorable treatment for electric generation that uses natural gas as its primary fuel (e.g., the statute requires the OCC to allow recovery of both a return on and return of CWIP costs prior to commercial operation).

Given these challenges and considerations around funding nuclear generation via an IOU's rate base, particularly the heightened costs associated with FOAK efforts, it makes sense to consider alternative funding sources. Such sources could include government loan guarantees;

significant, if not total, customer-funded development; and private funding raised by developers or independent power producers. The best way to identify effective funding alternatives or alterations to current regulatory funding methods in Oklahoma would be through developing a state strategic plan for nuclear generation. A state strategic plan would facilitate the consideration of applicable policy decisions and concerns while identifying funding methods most likely to achieve the state's overall goals.

3.4 Summary of Federal Funding Incentives

Recent legislation to incentivize growth and technological development in the nuclear power industry includes the following:

- Infrastructure Investment and Jobs Act
- IRA
- ADVANCE Act

3.4.1 Infrastructure Investment and Jobs Act

The 2021 Infrastructure, Investment, and Jobs Act included a program to incentivize preserving the current fleet of nuclear power facilities. The Civil Nuclear Credit Program provides up to \$6 billion to save operating nuclear power facilities facing imminent closure due to financial constraints. In order to claim a portion of these funds, the facility must demonstrate that closure is projected specifically due to economic circumstances. Facilities selected for assistance can claim the credit for up to 4 years through September 20, 2031, or until the funds are exhausted.

3.4.2 Inflation Reduction Act

The 2022 IRA allotted up to \$369 billion for investment in climate change initiatives and provided several incentives to encourage growth in the nuclear power industry, including for the deployment of new facilities and the continued operation of the current nuclear fleet. The incentives include the following:

- Production Tax Credit for Existing Reactors: This credit is available for nuclear reactor facilities operating between 2024 and 2032 and provides up to \$15 per MWh. The primary qualifying factors are labor and wage requirements, outlined in the IRA.
- Technology Neutral Production Tax Credit: This program serves to encourage the deployment of new nuclear power facilities and other energy sources in order to reduce carbon emissions. The tax credit provides two options to incentivize growth: (1) a production tax credit of \$25 per MWh for the first 10 years of facility operation, (2) a 30-percent investment tax credit for new facilities beginning operation in 2025 or after. While a facility can claim only one of these options, an additional 10-percent bonus is available for facilities constructed on a brownfield or retired fossil fuel site. This tax credit

may also be applied to other low-carbon energy sources with similar emissions profiles, such as wind, solar, and bioenergy facilities.

- **Hydrogen Production Tax Credit:** This credit provides an incentive of up to \$3 per kilogram of hydrogen produced at new or existing nuclear reactor facilities. The amount is determined by lifecycle greenhouse gas emission levels (the lower the emission level, the higher the tax credit). A facility's adherence to the wage and apprenticeship rules may also boost the credit amount.
- **HALEU Availability Program:** This program allocates \$700 million to support and incentivize further growth and development in the domestic supply chain for high-assay low-enriched uranium (HALEU).

In addition to the IRA tax credits for reducing carbon emissions, additional tax credits totaling \$60 billion were set aside for disadvantaged areas with environmental justice concerns. Approximately \$25 billion of the available tax credits are devoted to affordable housing, while the remainder apply to reducing carbon emissions and improving air quality in these areas.

3.4.3 ADVANCE Act

The 2024 ADVANCE Act directs the NRC to modernize its licensing processes and adjust fee structures to encourage FOAK reactor projects. This act works in tandem with the Price-Anderson Act, which ensures compensation for nuclear facility operators and contractors in the event of a nuclear accident. Nuclear reactor facilities rely on the compensation provided by the Price-Anderson Act to cover public damages resulting from a nuclear or radiological incident.

The ADVANCE Act outlines provisions to support growth in the nuclear power industry and accelerate the deployment of new facilities, including the following:

Development and Deployment of New Nuclear Technology

- Reduces regulatory costs for licensing advanced nuclear technologies.
- Creates incentives to deploy new nuclear reactor facilities.
- Requires the NRC to expedite licensing of nuclear facilities at brownfield and retired fossil fuel sites.

Domestic Nuclear Fuel Cycle and Supply Chain Infrastructure Development

- Directs the NRC to establish an initiative to expedite processes to qualify and license advanced nuclear fuels.
- Promotes the use of manufacturing techniques to expedite the construction of new nuclear reactors.
- Improves NRC efficiency.

- Provides staff hiring and retention tools to ensure the efficient review of advanced nuclear reactor licenses.
- Outlines NRC review processes based on performance metrics and milestone schedules to ensure nuclear licensing efficiency.

4.0 OKLAHOMA STATE POLICY CONSIDERATIONS FOR NEW NUCLEAR

4.1 Legislative and Policy Consideration

4.1.1 Legal and Regulatory Environment, Present and Future

4.1.1.1 Present

In general, the OCC has no jurisdiction over the type of generation a utility chooses. The rules relate to safety and adequacy to meet the utilities' demand for energy. OAC 165:35-25-3(a) states that:

Each utility shall install, operate, and maintain its entire plant and system in such condition as will enable it to furnish safe and adequate service, subject only to emergency conditions beyond its control. Utilities shall also perform routine inspections of overhead electric supply lines and accessible facilities for hazards to the public.

OAC 165:35-25-3(b) provides for how the equipment shall be constructed, installed, maintained, and operated in general:

The generating, transmission, and distribution system, including but not limited to generating plants and equipment, transmission lines, substations, overhead systems, underground systems, street lighting systems, service wires and support equipment attachments, transformers, meters and measuring equipment, and remote meter reading equipment, shall be constructed, installed, maintained, and operated in accordance with accepted good practice up to and including the point of delivery to the consumer. "Accepted good practice" shall be defined by the applicable rules governing installation, operations, maintenance, and safety contained in the NESC.

Regarding safety, the OCC regulates utilities to ensure compliance with the National Electric Safety Code (NESC). OAC 165:35-25-3(c) states that:

The installation and maintenance of electric utility systems shall comply with the NESC minimum standard requirements. (1) Only the specific minimum clearances required by the NESC shall be required by this Chapter. Construction and facilities which meet the specific minimum clearances shall be deemed to meet the purpose of the NESC of the "practical safeguarding of persons." Any additional clearances provided will be at the

discretion of the electric utility, or as directed by the Commission, and shall not be required or necessary to provide additional public safety. (2) On all underground construction completed after the effective date of this Chapter, the utility shall place warning labels (of a Commission-approved design) at all locations where aboveground equipment and facilities are readily accessible to the public. (3) The utility shall perform detailed inspections of its overhead facilities to identify any potential safety issues that could impact service or public safety. Utilities shall submit their inspection programs to PUD.

The only statute or rule addressing generation capacity requirements is based on demand and is in OAC 165:35-23-3(e), which states that:

The generating capacity of a utility's plant, supplemented by the electric power regularly available from other sources or firm contracts for electric power by a utility which operates no generating plants, must be sufficiently large to meet all normal demands for service and provide a reasonable reserve for emergencies.

The types of generation chosen are based on resource planning. OAC 165:35-37 et seq. require the utility to submit an IRP at least every 3 years.

The purpose of the IRP rules is to ensure that the utilities' resource planning and resulting investment are reasonably and prudently conducted and that the overall cost of power supply to retail ratepayers is fair, just, and reasonable. OAC 165:35-37-1(a) states:

The purpose of this Subchapter is to establish fair, just, and reasonable rules and procedures for Commission review of the resource plans of utilities. The utility resource plans establish additional bases for substantial investment and expenses incurred by utilities to provide electric supply to retail consumers. The practices and polices embodied in a utility's resource plan have direct, substantial effects on the costs and reliability of the electric supply to be provided to retail consumers in Oklahoma. Resource planning is a complex process affecting decisions that account for a substantial portion of the total cost of electricity over the long term, including investments in generation and transmission facilities, purchases of power and fuel supply, price volatility mitigation, and investments in energy efficiency. Recognizing the significance of the costs incurred based on resource plans, the Commission believes it is in the best interest of retail ratepayers and the utilities providing regulated retail electric supply to establish regular review of the utilities resource plans to ensure that the utilities' resource planning and resulting investment are reasonably and prudently conducted and that the overall cost of power supply to retail ratepayers is fair, just, and reasonable.

Once an IRP has been prepared, the OCC conducts public meetings allowing comments from interested persons. OAC 165:35-37-3 states as follows:

(a) A utility shall notify the Commission that it has prepared a proposed initial integrated resource plan at least thirty (30) calendar days prior to submission pursuant to 165:35-37-4. After giving notice, the Commission shall conduct a public meeting on the record concerning the utility's proposed initial integrated resource plan, allowing comment from interested persons as to the strengths and weaknesses of the proposed plan.

(b) The utility shall take into account the comments made at the public meeting and make such changes to the plan as seem reasonable.

(c) The utility shall make the proposed plan available prior to the public meeting to any person who requests it, except any portions subject to a Commission protective order.

(d) The Commission may conduct similar public meetings at its discretion concerning updates to the integrated resource plan as provided by 165:35-37-4.

In developing their IRPs, utilities compare the costs of different types of generation. The up-front capital costs of nuclear generation are often high compared to those of other generation sources (e.g., natural gas, wind, solar), which can pose challenges given the requirement that power costs to residential customers be fair, just, and reasonable.

If the utility chooses nuclear generation despite its higher cost versus other generation types, it may still proceed with its plan over objections at the public IRP meeting. In that event, the utility has two options (as with other generation types). The first is to seek preapproval of the project under 17 O.S. § 286(C), wherein the OCC reviews the need for generation and reasonable alternatives. The second option for the utility is to proceed with purchasing or constructing the project and then to seek to include the cost in its base rate by filing a rate case. In that case, the OCC would review need and cost, among other factors.

Aside from the current feasibility study, Oklahoma legislators amended 17 O.S. § 802.2, effective July 2, 2024, to include nuclear energy in the Oklahoma Energy Low Carbon Initiative. This strategic program aims to create, advance, and promote new and existing energy research and development, use, supply chain activity, and infrastructure related to Oklahoma's core energy competencies by:

Promoting research and development in the areas of conventional and unconventional oil and natural gas development and production, hydrogen production, storage, and distribution, CO₂ enhanced oil recovery, wind forecasting, advance biofuels, energy storage, water management, nuclear energy, energy policy and economic analysis, energy system optimization, renewable energy integration into the electrical grid, and similar energy technologies.

Additionally, on March 14, 2024, the Oklahoma Senate adopted Senate Resolution 30 urging federal legislators to work in good faith to enact legislation that reforms federal permitting and

environmental review processes to promote economic and environmental stewardship by expediting the deployment of modern energy infrastructure. These reforms are intended to enable faster, lower-cost construction of energy infrastructure of all kinds, without prejudice, including the domestic build-out of modern energy technologies including nuclear power, emissions management, hydrogen, critical mineral mining and processing, and other requirements for a modern energy system.

There are no legal or statutory impediments in Oklahoma for a utility to choose nuclear generation today. In fact, one of Oklahoma's IOUs filed a case for the Black Fox Nuclear Facility in 1973. The application was later withdrawn. As explained above, given the current regulatory landscape, the OCC's focus is on need, cost recovery, and fair, just, and reasonable rates, regardless of generation type.

4.1.1.1.1 Examples of Regulatory Changes Adopted by Other States to Support Nuclear Energy

Many states have passed resolutions supporting the use of nuclear energy, including legislation requesting nuclear feasibility studies, reducing or eliminating barriers to nuclear generation, identifying critical components needed for nuclear energy, and allowing for alternative cost-recovery methods such as CWIP recovery and the issuance of nuclear asset recovery bonds. (NEI 2025b) These include, but are not limited to, the following examples:

Indiana

In Indiana, a state like Oklahoma with no operating nuclear plants, the legislature added to Indiana Code 12.1, effective July 1, 2022, authorizing the construction and regulation of SMRs and directing the Indiana Utility Regulatory Commission (IURC) to establish rules for siting and approval of SMRs. The IURC established Rule 11, Certification Requirements for the Construction, Purchase, or Lease of Small Modular Nuclear Reactors by a Public Utility [170 IAC 4-11-1 et seq.].

On April 10, 2025, Indiana Governor Mike Braun issued Executive Order 25-48, Creating Economic Opportunity and Securing Indiana's Energy Future Through Advanced Nuclear Development, which directs the Secretary of Energy and Natural Resources and the Nuclear Indiana Coalition to advance the development of nuclear projects and SMRs in Indiana and to attract nuclear energy industry supply partners to the state.

On May 6, 2025, the Indiana governor signed House Bill 1007, which provides for, among other things, a credit against state tax liability for expenses incurred in the manufacture of an SMR in Indiana. The bill establishes procedures under which certain energy utilities may request approval for one or more of the following from the IURC: (1) an expedited generation resource plan to meet customer load growth that exceeds a specified threshold, (2) a generation resource submittal for the acquisition of a specific generation resource in accordance with an approved expedited generation resource plan, or (3) a project to serve one or more large-load customers.

The bill also sets forth: (1) the requirements for each type of request, (2) standards for financial assurances by large-load customers, and (3) cost-recovery mechanisms for certain acquisition or project costs incurred by energy utilities. Finally, it amends the statute concerning public utilities' annual electric resource planning reports to the IURC: for reports submitted after December 31, 2025, a public utility must include information on the amount of generating capacity or energy that it plans to retire or refuel for any electric generation resource of at least 125 MW.

Texas

Texas has been one of the most active states in taking legislative action to support and encourage nuclear energy, including its development, workforce training, and uranium resource management. Following are summaries of two related bills:

House Bill (HB) 14 (2025–2026):

- Established the Texas Advanced Nuclear Energy Office within the Office of the Governor for the purpose of providing strategic leadership for the advanced nuclear system in the state; to collaborate with interested stakeholders and state and local leaders to craft a statewide strategic advanced nuclear energy public outreach program; to promote the development of advanced nuclear reactors for dispatchable electric generation while creating high-wage advanced manufacturing jobs; to lead the transition to a balanced energy future by advancing innovative nuclear energy generation technologies while delivering safe and reliable energy solutions that address growing demand; to enhance the state's energy security, foster economic growth, and ensure the safety of future nuclear energy generation development; to identify barriers to the financial viability of nuclear energy generation and regulatory and licensing complexities that increase risks to developers of nuclear energy; to leverage the expertise and capacity of institutions of higher education, the nuclear energy industry, the industrial manufacturing sector, and regulatory stakeholders to develop a comprehensive strategic plan to ensure the development of advanced nuclear energy and associated technologies; and to support the development of an advanced nuclear energy supply chain and associated technologies.
- Provides for the hiring of a Nuclear Permitting Coordinator that would act as a single point of contact for stakeholders during the permitting and regulatory process, identifying active or likely siting opportunities, as well as providing guidance for regulated persons navigating local, state, and federal regulations.
- Established the Texas Advanced Nuclear Development Fund and associated grant programs to reimburse eligible utilities. Detailed requirements specify who is eligible for the grants, how to apply, and allowable uses for funds. The fund was set at \$350 million through the general appropriations process.

SB 1535 (2025–2026):

- Established the Advanced Nuclear Energy Workforce Development Program under the direction of the Workforce Commission.
- Mandated the development of a comprehensive strategic plan to address labor supply gaps, provide financial assistance for programming and outreach efforts to raise awareness of nuclear science and career opportunities, and create academic pathways and customized curriculum requirements to educate future professionals.

Virginia

Virginia has two existing nuclear generation facilities and four operating nuclear reactors. While Oklahoma does not have existing nuclear resources, Virginia’s experience in a mature nuclear environment offers valuable insight into areas of focus and strategies for supporting nuclear energy. In updating its 2020 strategic plan, Virginia issued the Strategic Plan for Nuclear Energy 2025–2029, highlighting several accomplishments:

- Legislation (SB 454 and HB 1491) passed in 2024 authorizes the recovery of development costs associated with new nuclear facilities.
- The Virginia Nuclear Energy Consortium and its members have worked with economic development groups to connect them with industry leaders.
- In 2023, the legislature supported the creation of the Virginia Innovative Nuclear Hub, a partnership among industry, academic institutions, and the Commonwealth to promote research and development opportunities. Initial funding was provided by the Virginia Department of Energy in 2024, with additional funding in 2025 to support two anchor projects: Phase 1 Virginia Research and Education Reactor Facility and Virginia Center of Nuclear Materials and Reliability.
- The Virginia Nuclear Energy Consortium and Virginia Innovative Nuclear Hub established a working group with stakeholders from Virginia’s public and private universities, community colleges, nuclear industry representatives, and economic development organizations to align academic programs with the needs of energy employment. The working group is developing a workforce plan for Virginia’s nuclear industry.

4.1.1.2 Future

As stated previously, the OCC stipulates no specific legal or statutory requirements that would prevent a utility in Oklahoma from choosing nuclear generation. However, current regulatory mechanisms for adding generation capacity, regardless of type, require that resulting rates be fair, just, and reasonable. Given the high capital investment required to develop nuclear generation and the early stages of advanced nuclear reactor design, the requirement to provide fair, just, and reasonable rates poses a challenge for establishing nuclear generation.

As shown, other states have taken steps to adjust their existing regulatory mechanisms to encourage or otherwise facilitate the deployment of nuclear generation. It is important to note that not all such efforts address the costs of deploying nuclear generation.

Oklahoma has demonstrated similar legislative adjustments to encourage natural gas generation. For example, in response to the growing presence of data centers and other large-load customers, the Oklahoma Legislature passed SB 480 in 2025. This legislation removed barriers to establishing natural-gas-based generation “behind the meter,” thereby clearing the way for large-load customers to develop generation resources for their own needs. This legislation recently amended 17 O.S. § 151(B), which now states:

Provided, that the term public utility shall not include or be taken to mean a corporation, association, company, individuals, their trustees, lessees, receivers, successors, or assignees engaged in the production of electricity, provided that such entity furnishes an electric service or commodity on the premises directly to itself, an affiliate, or tenants or indirectly by contracting with a public utility, rural electric cooperative, or municipality for the purpose of furnishing electric service to a specific customer or is an exempt wholesale generator, so long as that service or commodity is not resold as retail electric service or supplied indirectly or directly for public use. Nothing herein shall relieve such an entity of its obligation to comply with state and federal grid interconnection and registration requirements and associated costs from the applicable regional transmission organization or public utility in the state. There shall not be a requirement or an obligation for a public utility to serve any customer receiving electric service from an entity described herein. Further, it shall not limit any party from asserting a right they may otherwise be entitled to under Oklahoma law including filings with the Commission. Additionally, any project pursuant to this act shall be required to utilize a natural gas component in their power generation capacity.

Further statute amendments to include nuclear generation could encourage the deployment of nuclear generation in some circumstances.

Such statutory or rule amendments likely would have the greatest impact and best results if undertaken in conjunction with the goals and direction specified in a comprehensive strategic plan.

4.1.2 State-Level Policy Options

As Oklahoma evaluates its role in the national nuclear ecosystem, the state may examine both the potential deployment of advanced nuclear reactors and its participation in the associated supply chain, workforce, and capital markets. Key policy themes for consideration include: (1) establishing authorities, task forces, or commissions; (2) strengthening supply chain and manufacturing; (3) developing a skilled workforce; and (4) supporting project development.

4.1.2.1 Establishing Authorities, Task Forces, or Commissions

Oklahoma can look to other states that have created nuclear-specific entities following feasibility or interim studies. Several state governments have established authorities, task forces, or commissions, often within existing agencies or universities, to serve as nuclear topic clearinghouses, resources for state-level stakeholders, and primary points of contact for the industry. Examples include the following:

- Kentucky SB 198 (2024) established the Kentucky Nuclear Energy Development Authority within the University of Kentucky Center for Applied Energy Research to support and facilitate development of a nuclear energy ecosystem and prepare a nuclear energy workforce. The authority was required to produce a statewide site-suitability study for potential new reactor locations by December 1, 2025.
- Ohio HB 434 (2023) established the Ohio Nuclear Development Authority to serve as a resource for state and federal agencies regarding advanced nuclear research reactors, isotopes and isotope technologies, and high-level nuclear waste reduction and storage, with the goal of making Ohio a leader in these areas.
- Indiana EO 48 (2025) established the Nuclear Indiana Coalition consisting of representatives from relevant state agencies and the nuclear industry to examine the streamlining of both state and federal permitting and licensing of advanced nuclear reactors, cost reduction, and public engagement and education.
- Idaho, Indiana, Ohio, Kentucky, Michigan, New Hampshire, New York, Tennessee, Texas, and Utah have formed task forces or commissions to bring together government, utilities, academia, industry, and other stakeholders to explore policy options to consider advanced reactor technologies.

For Oklahoma, options could include creating a new nuclear or advanced energy entity housed within a state agency or higher-education institution, establishing an advanced energy task force, or designating an existing entity as the primary nuclear energy point of contact. Areas of focus for such an entity could include:

- **Financial Support:** Considerations could be identified through the evaluation of the full range of available financial support mechanisms, including qualification requirements, application procedures, tax incentives, and funding levels. State-level financial incentives or policy measures that might attract private investors could also be considered. For solutions involving utilities, collaborating with the OCC to review feasible risk-sharing arrangements and cost-cap mechanisms could aid in partially mitigating the significant capital investment.

- **Siting and Permitting:** Analysis of state siting and permitting requirements and mechanisms could identify potential changes that might streamline the siting and permitting processes in harmony with strategic plans or goals. This could also support the creation of a clearinghouse for information relevant to parties interested in locating nuclear energy generation within the state. Safety and environmental assessments could be included in the analysis.
- **Community and Public Engagement:** As highlighted in this study, public perceptions of nuclear energy, which have been trending in a more positive direction over the last several years, constitute a significant factor in planning for nuclear deployment. A focus on community and stakeholder engagement initiatives to educate the public and facilitate transparent dialogue on the issues could be helpful. This effort could also highlight the improved safety features of SMRs to build trust, informed decision-making, and public acceptance of nuclear energy in Oklahoma.
- **Technology Review:** SMRs come in a variety of configurations, have different technical capabilities and parameters, and are in different stages of design and regulatory review. Monitoring and reviewing the technologies as they evolve, with a focus on those best suited to support Oklahoma's energy needs, could offer useful information for those interested in development. Further, this information could provide useful guidance in developing strategic actions to attract, encourage, and sustain nuclear energy generation within the state.
- **Economic Development:** Nuclear projects can generate significant economic benefits for surrounding communities. Identifying communities that support nuclear generation and considering how to maximize the economic benefits for these communities could provide valuable insights. This effort might also include analyzing local workforce capacity, identifying economic incentives, and identifying relevant suppliers in the region.

4.1.2.2 Supply Chain and Manufacturing

Oklahoma could evaluate where existing industrial, fabrication, and logistics assets could be adapted or expanded to support nuclear-related manufacturing and services. Limited nuclear construction in recent decades, combined with specialized requirements for advanced reactor designs, has resulted in a constrained domestic nuclear supply chain. Supporting the commercial deployment of advanced nuclear reactors will require not only projects in host states but also revitalization of the full nuclear fuel cycle and related advanced manufacturing capabilities.

States have begun using policy to attract nuclear-related manufacturing:

- Tennessee Executive Order 101 (2023) created the Tennessee Nuclear Energy Advisory Council and allocates funding for grants and financial assistance to nuclear power businesses that relocate or expand operations in the state.

- New Jersey SB 235 (2024) created tax credits, within a specified percentage range, for manufacturers of equipment or components for advanced nuclear energy facilities located in the state.
- Indiana HB 1007 (2025) is a tax incentive for SMR manufacturers. It allows an eligible SMR manufacturing project to receive a 20-percent credit toward state tax liability.
- Wyoming Energy Authority matching grants: The Wyoming Energy Authority and Governor Mark Gordon selected BWXT as one of two candidates to receive funds from the Energy Matching Fund to assist in assessing the viability of deploying advanced nuclear technologies in the state. BWXT will work with Wyoming industries to define requirements for nuclear solutions to meet the base heat and power needs of the state's iron mining operations.

For Oklahoma, options could include directing state economic-development entities to identify opportunities for in-state fabrication, fuel services, engineering, and construction management linked to national or regional nuclear projects.

4.1.2.3 Workforce Development

Advanced nuclear deployment would create material workforce requirements for construction, operations, and supporting services. National projections indicate that large additions of nuclear capacity would require substantial numbers of additional workers over the coming decades across skilled trades, technical roles, and specialized nuclear positions. Meeting this demand will rely on state, community, and technical colleges to train construction workers, welders, electricians, pipefitters, and other trades, as well as programs for nuclear operators, technicians, and safety professionals.

States have taken several approaches:

- Nebraska LB 568 (2022) established a working group to award grants to community and state colleges for workforce training courses to meet the needs of the nuclear and hydrogen industries and appropriated dedicated funding to support those courses.
- Texas SB 1535 (2025) established an advanced nuclear energy workforce development program through the Texas Workforce Commission.

Other states, including Virginia through HB 1779 (2025), have created scholarship, grant, or internship programs targeted at nuclear-adjacent fields.

For Oklahoma, options could include coordinating among higher-education institutions, workforce agencies, utilities, and industries to identify specific skill sets necessary to support potential advanced nuclear or supply chain projects.

4.1.2.4 Enabling Development

States generally do not direct the construction of nuclear facilities but may remove institutional and procedural barriers so that nuclear resources can compete fairly within a common energy sector framework. Oklahoma could continue to assess various options to support nuclear development, including the following:

- Participating in regional consortia or multistate agreements that seek to aggregate demand for advanced nuclear technologies or provide a pipeline of projects sufficient to support supply-chain investments and financial risk sharing.
- Making advanced nuclear projects eligible for existing incentives given to qualifying advanced energy or industrial projects.
- Providing a coordinated state review in which a designated lead agency manages interagency consultation, timelines, and communication with applicants and local governments.
- Issuing a request for information or RFP for the advanced nuclear industry to gain a deeper understanding of how new nuclear generation could supply electricity and heat for both existing and proposed generation.

Options for Oklahoma might include directing the coordination among relevant stakeholders to identify next steps and define potential development incentives.

5.0 CONCLUSIONS

In its efforts to comply with the requirements outlined in Oklahoma SB 130, the OCC engaged with a wide range of nuclear experts and various stakeholders interested in the idea of developing nuclear power generation in Oklahoma. The result of this process has been the identification of a host of factors that should be subject to further detailed analysis and review, which would extend to include evaluating policy considerations should the decision be made to move from a question of feasibility to one of planning for implementation.

There is a nuclear energy renaissance underway in the United States and around the globe driven by the need to: meet ever-increasing energy demands (e.g., hyper-scalers); establish reliable, dispatchable energy generation sources; and minimize carbon emissions. There do not appear to be any technical limitations that would prevent Oklahoma from participating in the move toward nuclear development.

While the benefits of nuclear generation are considerable, to establish nuclear generation would require navigating a host of technical, financial, and socioeconomic factors in ways that best serve Oklahoma. Overall, Oklahoma is well positioned to lay the groundwork for supporting the development of nuclear energy generation.

As detailed in the study, Oklahoma already possesses significant workforce attributes. Its prominent oil and gas, aerospace, and precision manufacturing industries could lend their expertise to bridging nuclear energy generation development efforts. Even though Oklahoma does not have an active nuclear generation facility, a suitable workforce would not have to be built from scratch. Likewise, Oklahoma's educational assets are considerable: OSU, OU, and TU offer multiple nuclear-adjacent technical degrees. With the additional assets of career and technical training offered by 29 CareerTech centers on 62 campuses, including the OSU Institute of Technology and Tulsa Technology Center, Oklahoma has a significant educational infrastructure from which to build a talent pipeline.

The study also details the wide range of technologies being designed within the nuclear generation space, including SMRs. SMR technologies vary widely, using different fuels and fuel formats, heat-transference mechanisms, power outputs, and cooling methods (among other factors). Identifying a particular technology that would best meet Oklahoma's energy needs is beyond the scope of this study. Further consideration will be necessary as these technologies move through development and regulatory review processes.

Gen III and III+ reactors, which are designed based on proven PWR technology (e.g., Westinghouse AP1000 design), are farther along in the development process. Units 3 and 4 at Plant Vogtle in Georgia, the first commercial nuclear reactors built in the United States in roughly 30 years, are Westinghouse AP1000 designs. However, those reactors require a significantly larger undertaking than SMRs. Because traditional GW-scale LWRs require a 10- to 20-year construction timeline and significant costs, their consideration would require additional, and perhaps more complex, analysis.

With the timeline estimates for SMR nuclear energy facilities ranging from 5 to 10 years, from planning through initiating commercial operation, it will be important to monitor the progress and success of specific technologies. Doing so would position Oklahoma to consider availability and performance criteria, which are not yet known at this stage of development, when selecting a particular SMR technology or technologies that might be best suited for the state.

The study incorporated a preliminary high-level review of the environmental and ecological aspects of the nuclear siting process. The NRC has considerable oversight in determining siting criteria, including environmental and ecological requirements. The NRC's Regulatory Guide 4.7 guides applicants in addressing NEPA environmental considerations, including potential impacts on ecological systems, water use, land use, atmosphere, aesthetics, noise, and socioeconomics.

While there are currently no state-specific regulations for siting nuclear generation facilities in Oklahoma, applying Oklahoma's existing criteria for the siting of solid waste and hazardous waste disposal facilities [OAC 252:515 and OAC 252:204] might offer an additional and beneficial layer of protection in considering environmental and ecological factors. Critical among these are water source types and availability, which often encounter regulatory challenges. The DEQ is the primary state agency for managing Oklahoma's surface water resources, quality

standards, and use permitting. As of 2017, Oklahoma had nearly 56,000 miles of shoreline along lakes and ponds, containing approximately 1,400 square miles of water, and approximately 167,000 miles of rivers and streams.

Beyond ecological considerations, federal siting requirements also encompass geologic and seismic criteria, hydrology and flooding, population, land use, emergency planning, infrastructure, security, and regulatory/licensing feasibility. Siting criteria include the new nuclear facility's compatibility with existing land uses. Figure 2.2-7 identifies areas in Oklahoma that represent incompatible land uses for siting a nuclear facility.

The study also engaged military organizations regarding their plans for nuclear generation, particularly given the DoD's interest in developing nuclear energy to meet resiliency objectives and associated Executive orders directing the development of nuclear energy for defense and national security. It must be noted that the federal government shutdown in fall 2025 severely limited the engagement with this group of stakeholders. However, the study does capture input from Fort Sill, which indicated that current plans include expanding natural gas and backup energy technologies. Due to its low energy demand, Fort Sill's engagement with SMRs has been limited to research and high-level discussions. This set of stakeholders was also supported through the efforts of the City of Altus, which has been working with the Air Force to explore the suitability of land owned by the city for nuclear energy co-location to meet resilience objectives.

The costs associated with developing an SMR from planning to operation are considerable. Nuclear power plants require significant upfront costs and historically have tended to exceed budget estimates. While many project-specific variables contribute to the total project cost for a nuclear generation facility, the general estimate for a FOAK SMR is approximately \$3 billion to \$5 billion, including finance costs and contingencies. It is anticipated that, with the experience and efficiencies gained from each successive plant, the nth-of-a-kind (NOAK) cost will be approximately 60 to 70 percent of the FOAK cost.

With these considerable upfront capital costs, the OCC's traditional rate-recovery mechanisms would make it challenging for an IOU to rely on its rate base as the means of recovering such costs. In approving the construction of new generation facilities, nuclear or otherwise, the OCC must give consideration to a variety of factors, including whether the investment is prudent (particularly given available alternatives), in the public interest, and the most reasonable cost-effective way to meet the generation need. Given that the costs for an SMR range from four to eight times those of a gas-fired plant, it is unlikely that such a capital-intensive solution could compete with traditional fossil fuel generation. Accordingly, solving this challenge likely would require exploring alternative funding sources, such as government loan guarantees and incentives, customer funding participation, and private funding by developers and other stakeholders.

Setting aside costs, there are economic benefits from deploying nuclear generation facilities, such as employment opportunities, economic output, local labor income, and additional tax

revenue from sales and property taxes. In addition to construction and operations jobs, additional jobs within the region would be created indirectly due to the in-migrating workforce. Further, the added value of the property where a reactor is built is expected to generate increased property tax revenue, which can become a significant portion of the local government's income over the life of the reactor (approximately 40 to 80 years).

The study evaluated what other states have done in terms of studies, task forces, and energy plans, which are detailed in a comprehensive report published by the NEI (NEI 2025b). This report, summarized in section 4.1.1, highlights the actions of Indiana, Texas, and Virginia, which represent a cross-section of efforts at the state level:

- Like Oklahoma, Indiana does not have any existing operating nuclear facilities. The Indiana Governor directed the Secretary of Energy and Natural Resources and the Nuclear Indiana Coalition via an Executive order to advance the development of nuclear projects and SMRs in Indiana and to attract nuclear energy industry supply partners to the state.
- Texas has been one of the most active states in taking legislative action to support and encourage nuclear energy, including its development, workforce training, and uranium resource management.
- Virginia has two existing nuclear generation facilities and four operating nuclear reactors. Virginia's experience in a mature nuclear environment offers valuable insight into areas of focus and strategies for supporting nuclear energy. In updating its 2020 strategic plan, Virginia issued the Strategic Plan for Nuclear Energy 2025–2029.

Section 4.1.2.1 highlights other states' efforts to establish nuclear-specific entities following feasibility or interim studies. Several state governments have established authorities, task forces, or commissions, often within existing agencies or universities, to serve as nuclear topic clearinghouses, resources for state-level stakeholders, and primary points of contact for the industry. For example:

- Kentucky SB 198 (2024) established the Kentucky Nuclear Energy Development Authority.
- Ohio HB 434 (2023) established the Ohio Nuclear Development Authority.
- Indiana EO 48 (2025) established the Nuclear Indiana Coalition.
- Idaho, Indiana, Ohio, Kentucky, Michigan, New Hampshire, New York, Tennessee, Texas, and Utah have formed task forces or commissions to bring together government, utilities, academia, industry, and other stakeholders to explore policy options to consider advanced reactor technologies.

This study supports the conclusion that establishing nuclear energy generation in Oklahoma is feasible. However, the study also identifies and highlights a complex set of factors, issues, and policy determinations that must be addressed in order to move toward such deployment.

6.0 REFERENCES

ANS (American Nuclear Society). 2024. BWXT Announces Nuclear Manufacturing Plant Expansion. Retrieved from <<https://www.ans.org/news/article-5959/bwxt-announces-nuclear-manufacturing-plant-expansion/>> (accessed November 24, 2025).

AP (America's Power). 2025. One Way to Make Electricity More Affordable. December 9, 2025. Retrieved from <<https://americaspower.org/one-way-to-make-electricity-more-affordable/>> (accessed December 2025).

BBR (Bureau of Business Research). 2025. BBR Analysis: Economic Impacts of SMR Industry in Texas. January 2025. Retrieved from <https://ftp.puc.texas.gov/public/puct-info/industry/nuclear/BBR_SMR_Report.pdf> (accessed November 24, 2025).

BEA (Bureau of Economic Analysis). 2023. RIMS II Multipliers (2017/2023), Table 2.5: Total Multipliers for Output, Earnings, Employment, and Value Added by Detailed Industry Aggregation. Retrieved from <<https://apps.bea.gov/regional/rims/rimsii/placeorder.aspx>> (accessed July 16, 2025).

BLS (Bureau of Labor Statistics). 2025. Oklahoma Economy at a Glance. Retrieved from <<https://www.bls.gov/eag/eag.ok.htm>> (accessed November 24, 2025).

Boardman (Boardman Inc.). 2025. ASME Pressure Vessel Fabrication – Oklahoma City. Retrieved from <<https://www.boardmaninc.com/fabrication/asme-pressure-vessels/>> (accessed November 24, 2025).

CE (CareerExplorer). 2025. The Job Market for Non-Destructive Testing Specialists in the United States. Retrieved from <<https://www.careerexplorer.com/careers/non-destructive-testing-specialist/job-market/>> (accessed November 24, 2025).

DAF (Department of Air Force). 2025. Microreactor Pilot. Retrieved from <[https://www.eielson.af.mil/Portals/40/ENVIRONMENT/Micro-Reactor/2025%20Updates/DAF%20Microreactor%20Pilot%20Fact%20Sheet%20\(JUNE2025%20-%20FINAL\).pdf?ver=ly4ZHY1pAYcAj2CQc4I2TA%3d%3d](https://www.eielson.af.mil/Portals/40/ENVIRONMENT/Micro-Reactor/2025%20Updates/DAF%20Microreactor%20Pilot%20Fact%20Sheet%20(JUNE2025%20-%20FINAL).pdf?ver=ly4ZHY1pAYcAj2CQc4I2TA%3d%3d)> (accessed December 5, 2025).

De Groot, J. I. M., and L. Steg. 2010. Morality and Nuclear Energy: Perceptions of Risks and Benefits, Personal Norms, and Willingness to Take Action Related to Nuclear Energy. *Risk Analysis* 30, No. 9 (September 2010): 1363–1372. Retrieved from <<https://doi.org/10.1111/j.1539-6924.2010.01419.x>> (accessed January 28, 2026).

De Groot, J. I. M., L. Steg, and W. Poortinga. 2012. Values, Perceived Risks and Benefits, and Acceptability of Nuclear Energy. *Risk Analysis* 33, No. 2 (May 2012): 307–317. Retrieved from <<https://doi.org/10.1111/j.1539-6924.2012.01845.x>> (accessed January 28, 2026).

DIU (Defense Innovation Unit). 2025. To Secure U.S. Energy Dominance, the Department of Defense Selects Eligible Companies for the Advanced Nuclear Power for Installations Program. Retrieved from <<https://www.diu.mil/latest/DOD-selects-eligible-companies-for-the-Advanced-Nuclear-Power-for-Installations-Program>> (accessed December 5, 2025).

DOE (Department of Energy). 2002. The History of Nuclear Energy. January 31, 2002. Retrieved from <<https://www.energy.gov/search?keywords=history+of+nuclear+energy&page=0>> (accessed November 18, 2025).

DOE. 2023. Pathways to Commercial Liftoff: Advanced Nuclear. March 2023. Retrieved from <<https://www.uraniumresourcesfund.li/ws/media-library/58f2547ccab54e4d8dd78edaef8aa043/doe---pathways-to-commercial-liftoff---advanced-nuclear---march-2023.pdf>> (accessed January 23, 2026).

DOE. 2024a. Newly Signed Bill Will Boost Nuclear Reactor Deployment in the United States. Retrieved from <<https://www.energy.gov/ne/articles/newly-signed-bill-will-boost-nuclear-reactor-deployment-united-states>> (accessed November 11, 2025).

DOE. 2024b. 5 Workforce Trends in Nuclear Energy. Retrieved from <<https://www.energy.gov/ne/articles/5-workforce-trends-nuclear-energy>> (accessed November 24, 2025).

DOE. 2024c. Nuclear Reactor Safety Training and Workforce Development Program. Office of Nuclear Energy. 2024. Retrieved from <<https://www.energy.gov/ne/nuclear-reactor-safety-training-and-workforce-development-program#:~:text=The%20nation's%20current%20nuclear%20reactor,curriculum%20development%20and%20training%20implementation>> (last accessed March 2, 2026).

EIA (U.S. Energy Information Administration). 2025. Electricity: State Historical Tables for 2024. Retrieved from <https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.eia.gov%2Felectricity%2Fdata%2Fstate%2Fannual_generation_state.xls&wdOrigin=BROWSELINK> (accessed December 2025).

EPRI (Electric Power Research Institute). 2022. Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide). 2022 Revision. Retrieved from <<https://www.epri.com/research/programs/065096/results/3002023910>> (accessed August 8, 2024).

EPRI. 2024. Advanced Nuclear Technology: Single Site Evaluation Guide—Preliminary Assessment of a Predefined Site for Deployment of a New Nuclear Energy Facility. Retrieved from <<https://www.epri.com/research/programs/065093/results/3002030533>> (accessed December 1, 2025).

ESRI (Environmental Systems Research Institute). 2024. Federal Users Community – U.S. Electrical Power Transmission. Retrieved from <https://www.arcgis.com/home/user.html?user=Federal_User_Community> (accessed in ArcGIS Pro software).

ESRI. 2025. USA Census Block Group Boundaries and Urban Areas. Retrieved from <<https://www.arcgis.com/home/group.html?id=24838c2d95e14dd18c25e9bad55a7f82#overview>> (accessed in ArcGIS Pro software).

FEMA (Federal Emergency Management Agency). 2025. Earthquake Hazard Maps. Retrieved from <<https://www.fema.gov/emergency-managers/risk-management/earthquake/hazard-maps>> (accessed December 9, 2025).

GG (Google Groups). 2011. Welder Qualification. Retrieved from <<https://groups.google.com/g/materials-welding/c/PYA1p35MPow>> (accessed November 24, 2025).

GIF (Generation IV International Forum). 2025. Generation IV Goals, Technologies and GIF R&D Roadmap. Retrieved from <<https://www.gen-4.org/generation-iv-criteria-and-technologies>> (accessed December 1, 2025).

Glik, D. C. 2007. Risk Communication for Public Health Emergencies. *Annual Review of Public Health* 28, No. 1: 33–54. Retrieved from <<https://doi.org/10.1146/annurev.publhealth.28.021406.144123>> (accessed January 29, 2026).

GP (Georgia Power). 2024. Vogtle Unit 4 Enters Commercial Operation. Press release, April 29, 2024. Retrieved from <<https://www.georgiapower.com/news-hub/press-releases/vogtle-unit-4-enters-commercial-operation.html>> (accessed February 26, 2026).

Greenberg, M. 2009. Energy Sources, Public Policy, and Public Preferences: Analysis of U.S. National and Site-Specific Data. *Energy Policy* 37, No. 8: 3242–3249. Retrieved from <<https://doi.org/10.1016/j.enpol.2009.04.020>> (accessed January 29, 2026).

GridInfo. 2025. Electric Generation Insight: Directory of Power Plants in Oklahoma. Retrieved from <https://www.gridinfo.com/oklahoma/plants?o=balancing_authority&d=asc> (accessed December 2025).

Gupta, K., M. Nowlin, J. Ripberger, H. Jenkins-Smith, and C. Silva. 2019. Tracking the Nuclear “Mood” in the United States: Introducing a Long-Term Measure of Public Opinion About Nuclear Energy Using Aggregate Survey Data. *Energy Policy* 133 (October 2019). Retrieved from <<https://doi.org/10.1016/j.enpol.2019.110888>> (accessed January 29, 2026).

Gupta, K., J. Ripberger, A. Fox, M. Maiello, K. Peach, and H. Jenkins-Smith. 2024. Risk Communication and Public Response to Potential Radiation Emergencies in New York City. *Risk Analysis* 45, No. 6 (October 2024): 1–17. Retrieved from <<https://doi.org/10.1111/risa.17657>> (accessed January 29, 2026).

Ho, S. S., A. D. Leong, J. Looi, L. Chen, N. Pang, and E. Tandoc. 2019. Science Literacy or Value Predisposition? A Meta-Analysis of Factors Predicting Public Perceptions of Benefits, Risks, and Acceptance of Nuclear Energy. *Environmental Communication* 13, No. 4: 457–471. Retrieved from <<https://doi.org/10.1080/17524032.2017.1394891>> (accessed January 29, 2026).

Holtec (Holtec International). 2025. Small Modular Reactor. Retrieved from <<https://holtecinternational.com/products-and-services/smr/>> (accessed November 24, 2025).

IAEA (International Atomic Energy Agency). 2022. Climate Change and the Role of Nuclear Power, Proceedings Series – International Atomic Energy Agency. Retrieved from <<https://www.iaea.org/topics/nuclear-power-and-climate-change/climate-change-and-nuclear-power-2022>> (accessed November 11, 2025).

IPPRA (Institute for Public Policy Research and Analysis). 2025. Energy and Environment Survey Series. August 2025. Retrieved from <<https://www.ou.edu/ippra/research/energy>> (accessed February 6, 2026).

Keller, C., V. H. Visschers, and M. Siegrist. 2012. The Content and Not Only the Valence of Spontaneous Associations Should Be Analyzed. *Risk Analysis* 32, No. 3 (March 12, 2012): 481–482. Retrieved from <<https://doi.org/10.1111/j.1539-6924.2012.01794.x>> (accessed January 29, 2026).

Kim, Y., W. Kim, and M. Kim. 2014. An International Comparative Analysis of Public Acceptance of Nuclear Energy. *Energy Policy* 66 (March 2014): 475–483. Retrieved from <<https://www.sciencedirect.com/science/article/abs/pii/S0301421513011464?via%3Dihub>> (last accessed March 2, 2026).

MPSC (Michigan Public Service Commission). 2024. Michigan Nuclear Feasibility Study Report. Retrieved from <<https://www.michigan.gov/mpsc/commission/workgroups/nuclear-feasibility-study>> (accessed November 18, 2025).

NEA (Nuclear Energy Agency). 2022. Meeting Climate Change Targets: The Role of Nuclear Energy. OECD Publishing. Retrieved from <https://www.oecd-neo.org/jcms/pl_69396/meeting-climate-change-targets-the-role-of-nuclear-energy?details=true> (accessed November 11, 2025).

NEA. 2025. The NEA Small Modular Reactor Dashboard: Third Edition. Retrieved from <https://www.oecd-neo.org/jcms/pl_78743/the-nea-small-modular-reactor-dashboard?details=true> (accessed December 1, 2025).

NEI (Nuclear Energy Institute). 2021. The Economics of Small Modular Reactors – March 2021. Retrieved from <[https://www.nei.org/CorporateSite/media/filefolder/advanced/SMR-Start-Economic-Analysis-2021-\(APPROVED-2021-03-22\).pdf](https://www.nei.org/CorporateSite/media/filefolder/advanced/SMR-Start-Economic-Analysis-2021-(APPROVED-2021-03-22).pdf)> (accessed November 24, 2025).

NEI. 2025a. Jobs. Retrieved from <<https://www.nei.org/advantages/jobs>> (accessed November 24, 2025).

NEI. 2025b. State Legislation and Regulations Supporting Nuclear Energy. January 2025. Retrieved from <<https://www.nei.org/resources/reports-briefs/state-legislation-and-regulations>> (accessed December 2025).

NIA (Nuclear Innovation Alliance). 2024. Nuclear Reactor Licensing 101. Retrieved from <<https://nuclearinnovationalliance.org/sites/default/files/2024-10/Licensing%20101%20-%20October%202024.pdf>> (accessed December 1, 2025).

NIA. 2025. Advanced Nuclear Reactor Technology: A Primer. Retrieved from <<https://nuclearinnovationalliance.org/advanced-nuclear-reactor-technology-primer>> (accessed December 1, 2025).

NRC (U.S. Nuclear Regulatory Commission). 2011. Quality Assurance Training. Agencywide Documents Access and Management System (ADAMS) Accession No. ML11231a972. Retrieved from <<https://www.nrc.gov/docs/ml1123/ml11231a972.pdf>> (accessed November 24, 2025).

NRC. 2020. Nuclear Power Plant Licensing Process. Backgrounder. Office of Public Affairs. July 2020. ADAMS Accession No. ML052170295. Retrieved from <<https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/licensing-process-fs>> (accessed December 1, 2025).

NRC. 2024a. General Site Suitability Criteria for Nuclear Power Stations. Regulatory Guide 4.7, Revision 4. February 2024. ADAMS Accession No. ML23348A082.

NRC. 2024b. Generic Environmental Impact Statement for Licensing of New Nuclear Reactors, Draft Report. NUREG-2249. September 2024. ADAMS Accession No. ML24176A220.

NRC. 2024c. Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Regarding Comanche Peak Nuclear Power Plant. NUREG-1437, Supplement 60, Final Report. April 2024. ADAMS Accession No. ML24078A261.

NRC. 2025a. Boiling Water Reactors. Retrieved from
<<https://www.nrc.gov/reactors/power/bwrs>> (accessed November 18, 2025).

NRC. 2025b. Pressurized Water Reactors. Retrieved from
<<https://www.nrc.gov/reactors/power/pwrs>> (accessed November 18, 2025).

NRC 2025c. List of Power Reactor Units. Published February 21, 2025. Retrieved from
<<https://www.nrc.gov/reactors/operating/list-power-reactor-units>> (accessed January 9, 2026).

NRC. 2025d. Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Regarding Dresden Nuclear Power Station. NUREG-1437, Supplement 17, Final Report. September 2025. ADAMS Accession No. ML25233A275.

OCC (Oklahoma Corporation Commission). 2025. Case No. GD2025-000004, Amended Notice of Inquiry, IN RE: INQUIRY OF THE OKLAHOMA CORPORATION COMMISSION TO STUDY THE TECHNICAL AND LEGAL FEASIBILITY OF NUCLEAR ENERGY GENERATION IN OKLAHOMA. September 2, 2025. Retrieved from
<<https://public.occ.ok.gov/WebLink/DocView.aspx?id=19082542&dbid=0&repo=OCC&searchid=aff814e7-cf6c-4583-89be-cbc128de08c7>> (accessed December 1, 2025).

ODWC (Oklahoma Department of Wildlife Conservation). 2025. Threatened and Endangered Species. Retrieved from
<<https://www.wildlifedepartment.com/wildlife/threatened-and-endangered>> (accessed December 18, 2025).

OESC (Oklahoma Employment Security Commission). 2024. Oklahoma Employment and Wage Report. Retrieved from
<<https://oklahoma.gov/content/dam/ok/en/oesc/documents/labor-market/publications/occupation-and-wages/oklahoma-wage-report-2024.pdf>> (accessed November 24, 2025).

OGA (Office of the Governor of Alabama). 2023. Governor Ivey Announces Ultra Safe Nuclear Corp. Plans \$232 Million Micro-Reactor Assembly Plant in Gadsden, Creating 250 Jobs. Media release, June 21, 2023. Retrieved from <<https://governor.alabama.gov/newsroom/2023/06/governor-ivey-announces-ultra-safe-nuclear-corp-plans-232-million-micro-reactor-assembly-plant-in-gadsden-creating-250-jobs/#:~:text=MONTGOMERY%20%E2%80%93%20Governor%20Kay%20Ivey%20announced,%20Leading%20Micro%20Modular%20Reactor>> (accessed November 11, 2025).

OGT (Office of the Governor of Tennessee). 2023. Governor Lee Issues Executive Order to Advance Nuclear Energy Innovation and Investment. Media release, May 16, 2023. Retrieved from <<https://www.tn.gov/governor/news/2023/5/16/gov--lee-issues-executive-order-to-advance-nuclear-energy-innovation---investment.html>> (accessed January 29, 2026).

OGWV (Office of the Governor of West Virginia). 2023. Letter to the U.S. Nuclear Regulatory Commission. Retrieved from <<https://www.nrc.gov/docs/ML2303/ML23039A192.pdf>> (accessed November 11, 2025).

OSU (Oklahoma State University). 2024. Enrollment Data. Retrieved from <<https://ceat.okstate.edu/accreditation/enrollment-data.html>> (accessed November 24, 2025).

OSUE (Oklahoma State University Extension). 2017. Water-based Recreation in Oklahoma: Water Rights, Valuation and Implication for Public Policy, Economic Development, and Management. Retrieved from <<https://extension.okstate.edu/fact-sheets/water-based-recreation-in-oklahoma.html#:~:text=Surface%20waters%20form%20the%key,use%20it%20as%20they%20wish>> (accessed December 9, 2025)

OSUIT (Oklahoma State University Institute of Technology). 2025. Power Plant Technology Plan of Study. Retrieved from <<https://osuit.edu/site-files/documents/plans-of-study/sect-power-plant-plan.pdf>> (accessed November 24, 2025).

OU (University of Oklahoma). 2025. University of Oklahoma – Enrollment Summary Report Fall 2025. Retrieved from <<https://www.ou.edu/content/dam/irr/docs/Enrollment%20Statistics/Enrollment%20Summaries/Fall/Enrollment-Summary-FA25.pdf>> (accessed November 24, 2025).

OUHSC (University of Oklahoma Health Sciences Center). 2025. Physics Faculty – OU College of Medicine. Retrieved from <<https://medicine.ouhsc.edu/academic-departments/radiological-sciences/faculty-staff/physics>> (accessed November 24, 2025).

OWRB (Oklahoma Water Resources Board). 2025. Surface Water – Data and Maps. OWRB Lakes (100K) and Streams (100K). Retrieved from <https://www.owrb.ok.gov/maps/pmg/owrbdata_SW.html> (accessed December 9, 2025).

Parkhill, K. A., N. F. Pidgeon, K. L. Henwood, P. Simmons, and D. Venables. 2009. From the Familiar to the Extraordinary: Local Residents' Perceptions of Risk When Living with Nuclear Power in the U.K. *Transactions of the Institute of British Geographers* 35, No. 1 (December 2009): 39–58. Retrieved from <<https://doi.org/10.1111/j.1475-5661.2009.00364.x>> (accessed January 29, 2026).

Paullin, C. 2022. Youngkin's Energy Plan Calls for Reevaluation of Clean Economy Act. *Virginia Mercury*, October 4, 2022. Retrieved from <<https://viriniamercury.com/2022/10/04/youngkins-energy-plan-calls-for-reevaluation-of-clean-economy-act/>> (accessed November 11, 2025).

PCC (PCC Aerostructures). 2025. Southwest United Industries – Tulsa. Retrieved from <<https://www.pccaero.com/companies/swu/swui-tulsa.html>> (accessed November 24, 2025).

SCO (Strategic Capabilities Office). 2025. Project Pele: Mobile Nuclear Reactor. Retrieved from <https://www.cto.mil/pele_eis/> (accessed December 5, 2025).

Siegrist, M. 2000. The Influence of Trust and Perceptions of Risks and Benefits on the Acceptance of Gene Technology. *Risk Analysis* 20, No. 2 (May 2000): 195–204. Retrieved from <<https://doi.org/10.1111/0272-4332.202020>> (accessed January 29, 2026).

Siegrist, M., and G. Cvetkovich. 2000. Perception of Hazards: The Role of Social Trust and Knowledge. *Risk Analysis* 20, No. 5 (May 2000): 713–720. Retrieved from <<https://doi.org/10.1111/0272-4332.205064>> (accessed January 29, 2026).

Slovic, P. 1996. Perception of Risk from Radiation. *Radiation Protection Dosimetry* 68, nos. 3-4 (December 1996): 165–180. Retrieved from <<https://doi.org/10.1093/oxfordjournals.rpd.a031860>> (accessed January 29, 2026).

Slovic, P. 2012. The Perception Gap: Radiation and Risk. *Bulletin of the Atomic Scientists* 68, No. 3 (November 2015): 67–75. Retrieved from <<https://doi.org/10.1177/0096340212444870>> (accessed January 29, 2026).

Slovic, P., B. Fischhoff, and S. Lichtenstein. 1982. Why Study Risk Perceptions? *Risk Analysis* 2, No. 2 (June 1982): 83–93. Retrieved from <<https://doi.org/10.1111/j.1539-6924.1982.tb01369.x>> (accessed January 29, 2026).

SWL (Southwest Ledger). 2025. Energy Workforce Numbers Decline Across State, Nation. Retrieved from <<https://www.southwestledger.news/news/energy-workforce-numbers-decline-across-state-nation>> (accessed November 24, 2025).

TCC (Tulsa Community College). 2025. Quality and Inspection Technician Certificate I. Retrieved from <<https://www.tulsacc.edu/academics/programs-courses/quality-inspection-technician-certificate-i-engineering-technology>> (accessed November 24, 2025).

TNEAC (Tennessee Nuclear Energy Advisory Council). 2023. Final Report and Recommendations. Retrieved from <https://www.tn.gov/content/dam/tn/environment/energy/documents/tneac/tneac_final-report-and-recommendations.pdf> (accessed November 24, 2025).

UCN (University of Chicago News). 2025. The First Nuclear Reactor, Explained. Retrieved from <<https://news.uchicago.edu/explainer/first-nuclear-reactor-explained>> (accessed November 18, 2025).

USDA (U.S. Department of Agriculture). 2025. Natural Resources Conservation Service (NRCS). Geospatial Data Gateway – Federal, State, Tribal, etc. Protected Areas Land Ownership. Retrieved from <<https://datagateway.nrcs.usda.gov/GDGOrder.aspx>> (accessed December 8, 2025).

USDOT (U.S. Department of Transportation). 2025. National Transportation Atlas Database – Aviation Facilities and Military Installations. Retrieved from <<https://geodata.bts.gov/>> (accessed December 8, 2025).

USFWS (U.S. Fish and Wildlife Service). 2015. Environmental Conservation Online System (ECOS) – USFWS Threatened and Endangered Species Active Critical Habitat Report. Critical Habitat Shapefile. Retrieved from <<https://ecos.fws.gov/ecp/report/table/critical-habitat.html>> (accessed December 7, 2025).

USGS (U.S. Geological Survey). 2025. Quaternary Fault and Fold Database of the United States. Retrieved from <<https://www.usgs.gov/programs/earthquake-hazards/faults>> (accessed December 9, 2025).

VDOE (Virginia Department of Energy). 2024. Virginia's 2022 Energy Plan. Retrieved from <<https://www.energy.virginia.gov/va-energy-plan.shtml>> (accessed November 11, 2025).

Vischers, V. H. M., C. Keller, and M. Siegrist. 2011. Climate Change Benefits and Energy Supply Benefits as Determinants of Acceptance of Nuclear Power Stations: Investigating an Explanatory Model. *Energy Policy* 39, No. 6 (June 2011): 3621–3629. Retrieved from <<https://doi.org/10.1016/j.enpol.2011.03.064>> (accessed January 29, 2026).

-
- WC (Wall Colmonoy). 2025. Aerobraze OKC. Retrieved from <<https://metals.wallcolmonoy.com/products-capabilities/aerobraze-oklahoma-city>> (accessed November 24, 2025).
- Webco (Webco Industries). 2025. Corporate Brochure. Retrieved from <<https://www.webcotube.com/wp-content/uploads/corporate-brochure.pdf>> (accessed November 24, 2025).
- Westinghouse (Westinghouse Electric Company, LLC). 2025a. AP1000 Pressurized Water Reactor. Retrieved from <https://westinghousenuclear.com/media/jhlfh5l5/32201_wec-ap1000_flysheet_digital-1-1.pdf> (accessed December 5, 2025).
- Westinghouse. 2025b. AP1000 Plant Passive Safety Systems and Timeline for Station Blackout. Retrieved from <<https://westinghousenuclear.com/media/eiydeoeu/ap1000-plant-passive-safety-systems-and-timeline-for-station-blackout.pdf>> (accessed December 5, 2025).
- Whitfield, S. C., E. A. Rosa, A. Dan, and T. Dietz. 2009. The Future of Nuclear Power: Value Orientations and Risk Perception. *Risk Analysis* 29, No. 3 (February 2009): 425–437. Retrieved from <<https://doi.org/10.1111/j.1539-6924.2008.01155.x>> (accessed January 29, 2026).
- WNA (World Nuclear Association). 2025. Nuclear Power Reactors. Retrieved from <<https://world-nuclear.org/information-library/nuclear-power-reactors/overview/nuclear-power-reactors>> (accessed December 16, 2025).
- Young, C. 2023. NRC Approves Advanced Reactor Rule After West Virginia Sen. Capito Testifies. August 15, 2023. Retrieved from <<https://www.capito.senate.gov/news/in-the-news/nrc-approves-advanced-reactor-rule-after-west-virginia-sen-capito-testifies>> (accessed November 11, 2025).



**Attachment A: Oklahoma Nuclear Energy Generation
Feasibility Study Working Group Members**

**State of Oklahoma Nuclear Feasibility Study
Working Group Members**

American Electric Power

Shane Lies

Assistant Secretary of the Army

Robert B. Hughes

Canadian Valley Electric Cooperative

Gary Highley

City of Altus

Gary Jones

Chris Riffle

Crowe Dunlevy

Don Shandy

Department of Energy and the Environment

Chris Schinnerer

Jeff Starling

Department of the Air Force

Kirk A. Phillips

Enercon Services, Inc.

Joanne Aleksick

Tim Basham

Jay Basken

Sam Chau

Dana Duncan

Lisa Hendrick

Joe Kowalczyk

Heather Medlock

Jerry Riggs

Rachel Turney-Work

Fred Woolridge

Envoy Public Labs

Madeline MacDevette

Hamm Institute

Katie Altshuler

Jason Angolano

Institute for Public Policy Research & Analysis (IPPRA), University of Oklahoma

Dr. Kuhika Gupta
Dr. Hank Jenkins-Smith

Nuclear Energy Institute

Kristy Hartman
Marcus Nichol

Oklahoma Corporation Commission

Mark Argenbright	Geoff Rush
Scott Irwin	Natasha Scott
David Melvin	Mike Velez
Fairo Mitchell	

Oklahoma Department of Environmental Quality

Keisha Cornelius
Kelly Dixon

Oklahoma Gas and Electric Company

Aadarsh Bhetuwal
Kelly Riley

Oklahoma Municipal Power Authority

David Osburn
Jennifer Rogers

Oklahoma Office of the Attorney General

Thomas Grossnicklaus

Oklahoma State Regents for Higher Education

Jarrett Jobe

Tinker Air Force Base

Stephanie Wilson

U.S. Army

Col. Derek Baird
Lt. Col. Montana Dugger
Col. Cory Newcomb

Westinghouse

Agata Leszkiewicz



**Attachment B: Stakeholder Responses to Oklahoma
Nuclear Energy Generation Notice of Inquiry
(Case Number GD2025-000004)**

Public Service Company of Oklahoma (PSO)

PSO provided the following responses to the questions posed in the NOI.

Part A, Question 1:

Advantages and disadvantages of generating nuclear energy in this state, including, but not limited to, the economic and environmental impacts

1. Nuclear power is safe. The designs of the advanced reactors (discussed in more detail below) have incorporated 50 years of lessons learned from the current domestic nuclear fleet and are orders of magnitude safer than earlier generations. These designs are “walk-away” safe, meaning that they will safely shut themselves down without operator intervention or emergency power.
2. Nuclear power has the following advantages:
 - a. dispatchable: the power is there when it is needed
 - b. energy density: significant power is generated on a small footprint
 - c. energy security: there is enough fuel contained in the nuclear reactor to operate for many months, eliminating fuel supply concerns
 - d. positive environmental attributes
3. It is projected that domestic nuclear generation will experience significant growth over the next 25 years. Should it manifest as forecasted, it represents a significant economic opportunity for the State of Oklahoma.
4. The hyper-scalers and other large industrial companies desire to power their growth with the reliable power (capacity factor greater than 92 percent) that nuclear generation provides. They have expressed their desire to grow in those states that have nuclear capacity to offer. An economic analysis completed for a representative metropolitan statistical area determined that the construction of a nuclear plant could result in thousands of construction jobs, millions of dollars of construction labor wages, and hundreds of millions of dollars in regional impact from the direct, indirect, and induced wage impacts. Ongoing plant operations will result in hundreds of permanent jobs, millions of dollars of wages, thousands of jobs due to indirect and induced impacts, tens of millions of dollars in annual property tax, and a total regional impact in the hundreds of millions of dollars.

Part A, Question 2:

Methods to maximize existing workforce and products made in this state for the construction of nuclear energy generation facilities

Nuclear energy generation facilities will require a workforce composed of both degreed and non-degreed employees. As the prospect of nuclear generation in the state becomes more likely, the state can encourage enrollment at universities and colleges in the necessary technical

programs, such as engineering, chemistry, radiation protection, and environmental science. Equally important, the state can work with the high schools and trade associations to promote enrollment in the study of necessary trades, such as mechanics, electricians, welders, pipe fitters, boilermakers, and carpenters.

With respect to products, as the saying goes, “if you build it, they will come.” It is expected that supply chain growth will be one of the more significant induced benefits from having nuclear generation in the state. Based on multiple discussions with various suppliers, the promise of a nuclear plant is not enough to entice them to expand their businesses; they must see the firm commitment demonstrated by actual construction. As such, the best way to maximize products in the state for the construction of nuclear energy generation facilities is to commence construction.

Part A, Question 3:

Design characteristics, including recommendations for design specification and site selection

There are many advanced reactor designs in some stage of design and development, ranging from large (>1000 megawatts [MW]) to small (20–300 MW) to micro (<20 MW). These designs are generally grouped into two categories: generation III+ (Gen III+) and generation IV (Gen IV).

Gen III+ reactors most closely resemble the current domestic fleet because they use water as a coolant and low-enriched uranium as fuel. In contrast, Gen IV reactors use coolants other than water, such as helium, sodium, and salt. Moreover, Gen IV reactors require fuel with a higher uranium enrichment, called high-assay low-enriched uranium (HALEU). The selection of a reactor design will be determined largely by the customer’s needs. For instance, hyper-scalers will need electricity to power their data centers, while a large industrial customer may need high-temperature process steam.

The site selection process must satisfy two primary needs. First, the site must have attributes that support the construction of the facility; second, the site must meet the requirements of the U.S. Nuclear Regulatory Commission (NRC). For the former, the site must: (1) be greater than 250 acres to support multiple reactors, including construction laydown areas; (2) preferably be close to a large water source, although air-cooling is also a viable option; and (3) preferably be close to existing high-voltage transmission lines to avoid the additional cost of transmission buildout. Additionally, it is much preferred that the site be located within an energy community as defined by the U.S. Department of Energy (DOE), which would make the project available for an additional 10-percent investment tax credit bonus. With respect to the NRC requirements, the site must be characterized to ensure that it meets all environmental requirements. Specifically, meteorology and hydrology data must be collected, and the ground composition and site seismology must be evaluated. These environmental data must meet NRC requirements to receive the construction permit.

Part A, Question 4:

Environmental and ecological impacts

In addition to the evaluation of the environmental impacts discussed in question 3, cultural and ecological screenings will also be conducted for all proposed sites. The cultural study will search for subsurface remains such as artifacts, burial grounds, and structures related to indigenous settlements or colonial settlements. The ecological screening will map the ecosystem to ensure that protected habitats and species, such as wetlands and endangered species, will not be harmed.

Part A, Question 5:

Land and siting criteria, including specific geographic areas that are best suited for new nuclear generation, as well as cities near military bases that may use new nuclear electric generation to meet the military resiliency requirements of 10 U.S.C., Section 2920

The land and siting criteria were discussed in the answers to questions 3 and 4. The Department of Defense (DoD) has expressed great interest in using nuclear energy to meet their resiliency requirements, and American Electric Power (AEP) is currently working directly with two such installations. The land and siting requirements are largely the same as those detailed in the answers to questions 3 and 4. It is important to note that in order to meet the military resiliency requirement, the nuclear plant must be located on the base property. Generally, however, the energy needs of a base are not great enough by themselves to use the entire output from a small modular reactor (SMR). Therefore, under normal circumstances, it is expected that excess power will be available on the grid for general use.

Part A, Question 6:

Safety criteria

The safety criteria for a nuclear generation facility are detailed in the Code of Federal Regulations (CFR), Title 10, Part 50, Domestic Licensing of Production and Utilization Facilities. Prior to building a nuclear plant, the licensee must receive approval from the NRC in the form of a construction permit. All licensees must submit a construction permit application (CPA), composed of two main parts: the environmental assessment and the Preliminary Safety Analysis Report (PSAR). Within the PSAR, the licensee documents how all safety requirements are satisfied. The completed CPA is presented to the NRC for review. If it is approved, a construction permit is issued. Generally, it takes 18–24 months to prepare a CPA and an additional 12–18 months for the NRC to complete their review.

Part A, Question 7:

Engineering and cost-related information

There are many project-specific variables that determine total project cost for a nuclear generation facility; however, it is generally estimated that the all-in cost of the first-of-a-kind (FOAK) SMRs will be approximately 3 to 5 billion dollars, including finance costs and contingency. It is also expected that the SMR cost will decline as each successive plant is built

until the price plateaus after the nth-of-a-kind (NOAK) SMR. It is estimated that the NOAK cost will be 60 to 70 percent of the FOAK cost.

Part A, Question 8:

Small modular nuclear reactor and microreactors capability

SMRs range in power from 20 to 300 MW, while microreactors generate less than 20 MW. SMRs will generally be commercially deployed to provide electricity to the grid and process heat for large industrial customers. Microreactors will generally be utilized to provide power to remote locations, such as military forward operating bases, disaster recovery zones, isolated communities, and oil wells.

Part A, Question 9:

Socioeconomic factors, including, but not limited to:

- a. workforce education, training, and development;***
- b. local and state tax base;***
- c. supply chain capability;***
- d. permanent and temporary job creation;***
- e. timeline for development, including areas of potential efficiencies, and potential leveraging of existing facilities within this state;***
- f. literature review of studies that have assessed the impact of nuclear energy generation; and***
- g. policy recommendations to support nuclear energy generation, including a survey of federal programs to financially assist the development of a nuclear project in this state.***

Most of these items have been touched upon in previous answers. In addition, the general timeline for constructing an SMR is approximately 7 years. The first 3 years are for site characterization and approval of the construction permit, and the final 4 years are to complete construction and achieve commercial operation. As the industry progresses from FOAK to NOAK, the time to build is expected to decrease by 1 to 2 years based on the incorporation of lessons learned.

Part B, Question 1:

What are the appropriate regulatory oversight mechanisms?

- a. Which Oklahoma agencies are most appropriate to regulate nuclear energy, which may or may not include using existing or new agencies?***
- b. How do other states regulate/oversee nuclear energy generation?***
- c. In other states, how are those regulatory agencies funded (e.g. general appropriations, annual assessment, etc.)?***
- d. What specific areas related to nuclear generation will require state regulatory oversight?***

- e. Which federal agencies regulate nuclear energy facilities, and what is the extent of their oversight authority?**
- a. In general, states regulate nuclear facilities with a combination of the state regulatory commission and the state's environmental agency.
 - b. Although most states do not have a separate agency specifically devoted to the regulation of nuclear facilities, Ohio, for example, regulates its nuclear facilities via a utility radiological safety board, created by state law. See Chapter 4937 - Ohio Revised Code | Ohio Laws.
 - c. The Ohio board is funded by assessments against the utilities that own nuclear facilities. See Section 4937.05 - Ohio Revised Code | Ohio Laws.
 - d. The key areas for state regulation are approval to construct the facility, if applicable, rates, and environmental regulations that are not preempted by the federal Environmental Protection Agency (EPA).
 - e. The federal Atomic Energy Act of 1946 (AEA), amended in 1954, provides the framework to regulate, at the federal level, all phases of nuclear energy production and the production of radioactive materials. The NRC, the DOE, and EPA share implementation responsibilities under the AEA.

Congress established the NRC as an independent agency in 1974 to ensure the safe use of radioactive materials for beneficial civilian purposes while protecting people and the environment. The NRC regulates commercial nuclear power plants and other uses of nuclear materials.

The EPA's role is to issue generally applicable environmental radiation standards, which other federal and state organizations must follow when promulgating radiation standards for their jurisdictions. The EPA assists these organizations in their development of radiation protection requirements by publishing guidance and by working directly with states to establish and execute radiation programs.

The DOE's authority extends to source material and spent fuel.

Part B, Question 2:

Because the Commission is constitutionally charged with ensuring rates are fair, just, and reasonable, what actions can/should the Commission implement to minimize ratepayer risks associated with investment in nuclear generation?

The Commission can promote actions that protect the ratepayers and the health of the utility, given the extended period of construction. One option is to permit the utility to recover the costs associated with early site development as they are incurred. This would allow the utility to avoid carrying a significant amount of unrecoverable costs on its books for years until it begins operating and is able to recover the costs. Early site development can result in an NRC-issued early site permit, which can be transferred should the utility choose not to pursue the construction of the nuclear facility. Any proceeds from the sale of an early site permit can be

credited to the ratepayers. Two of PSO's affiliates operate in jurisdictions (Virginia and Indiana) with legislation that codifies this policy. See, for example, § 56-585.1:15 (effective until July 1, 2034). Recovery of development costs associated with small modular nuclear facility.

Second, Oklahoma's policy allowing the recovery of Construction Work in Progress (CWIP) costs associated with gas facilities could be extended to include new nuclear facilities. As financing costs for such projects are considerable, such a policy would significantly reduce project costs and improve the likelihood of project implementation.

Third, Oklahoma could establish clear guidelines for the recoverability of costs should the utility decide that it is the more reasonable and prudent course to abandon a project.

Part B, Question 3:

To the extent it is found to be feasible to have nuclear energy generation in Oklahoma, what steps are required, and who would be responsible for coordinating among stakeholders to navigate the processes associated with attracting and developing a nuclear energy ecosystem?

In the PSO's experience, such a venture would require a coordinated effort between the utilities, the Commission, local economic development organizations, industry, and potential customers.

Part B, Question 4:

What are the advantages and disadvantages of nuclear energy generation in Oklahoma relative to energy diversification, reliability, and/or sustainability?

Nuclear energy—specifically, SMRs—can play a critical role in addressing the resource and energy adequacy challenges and ensure long-term resource and energy adequacy in several key ways:

- SMRs have the highest accredited capacity values compared to other resources, providing a reliable energy source during peak demand periods.
- Unlike wind and solar, which are dependent on weather conditions, SMRs generate electricity continuously, with capacity factors near or above 90 percent, making them an essential complement to variable renewable energy resources, ensuring that there is always sufficient power available, even during compound energy droughts. Their ability to provide firm capacity strengthens overall energy adequacy and prevents reliability issues such as rolling blackouts or supply shortages.
- As sectors such as artificial intelligence (AI) drive data center load growth, overall electricity demand is expected to grow significantly. Ensuring adequate supply to meet this rising demand requires investment in new generation capacity. SMRs provide a scalable and modular approach, allowing utilities to add capacity in increments that align with evolving demand patterns, rather than making large, one-time investments in oversized power plants.

- Extreme weather events, such as winter storms, heat waves, and hurricanes, can strain the grid by increasing demand and disrupting fuel supplies. SMRs improve resilience by operating independently of weather conditions and incorporating inherent safety features, as described above, that enhance their ability to withstand extreme events.
- The siting flexibility and improved safety features of SMRs provide a potential benefit of being situated closer to load centers, reducing transmission investments and risk.
- A diverse energy mix reduces dependency on any single fuel source, mitigating risks associated with supply shortages and price volatility.
- SMR electrical output can be increased or decreased to complement intermittent renewable generation, enhancing system reliability.

Part B, Question 5:

Describe the technical differences between nuclear fission and nuclear fusion, as well as associated public perceptions of each.

In nuclear fission, atoms of Uranium-235 (U-235) are bombarded with free neutrons, causing them to split and release heat. That heat is used to create steam, which drives a turbine connected to a generator, ultimately making electricity. In nuclear fusion, hydrogen atoms are fused together, which releases the heat that will be used to generate electricity. Although there has been great progress made with fusion, widespread commercial deployment of fusion power plants will likely not happen until the 2040s. The core of a fusion reactor is plasma, which is essentially no different from the Sun. As plasma reaches temperatures exceeding 200 million degrees Fahrenheit, the major technical challenge is how to contain it. That containment is accomplished using an extremely powerful magnetic field that allows the plasma core to float freely. Materials capable of withstanding those extreme temperatures and magnetic forces must still be developed to support commercial operation.

Oklahoma Gas and Electric Company (OG&E)

OG&E provided the following responses to the NOI.

The areas of inquiry in this docket cover significant topics that are beneficial and necessary to meet both the present and future energy needs of customers in Oklahoma. Given the impactful nature of the topics included in this inquiry, the Company appreciates the collaborative process that has been laid out by the PUD and the Commission, for all electric utilities to provide comment.

OG&E presents the following comments in response to the NOI questions propounded on August 27, 2025. The Company has included nuclear generation costs and performance characteristics in its recent integrated resource plans (IRPs) as required by the Commission. The Oklahoma statute governing IRPs requires utilities to pursue the lowest reasonable cost generation plans. OG&E's 2024 IRP showed the projected capital cost of SMRs, a type of nuclear technology, to be relatively high compared to other available generation options, and these costs for generation are ultimately borne by OG&E's customers. As research and development continue and further demonstration projects become operational, these costs are generally expected to decline over time.

OG&E supports a diverse generation fleet to serve our customers. OG&E's IRPs have an objective of Fuel and Technology diversity to mitigate future risk in fuel pricing, regulation, and availability, which all have the potential to impact our customers. The addition of new nuclear generation in Oklahoma would certainly diversify the fuel and technology mix used to support OG&E's customers and would provide reliability and risk mitigations associated with a diversified generation fleet.

OG&E's most recent request for proposals (RFP) for generation was the 2024 All Source Request for Proposals. The RFP allowed for bids from any resource type, including nuclear technology, but did not receive any bids for this technology.

As the research and development of nuclear technologies, including SMRs, continue, OG&E looks forward to demonstrations of safe, robust, and cost-effective new nuclear generation projects and participation of such projects in OG&E's future RFPs. OG&E looks forward to continued assessments of nuclear generation, provided such new generation could provide its customers with reliable, affordable, and safe power.

OG&E appreciates the opportunity to provide its initial comments regarding nuclear feasibility in Oklahoma. This topic is an important issue to Oklahoma's electric utility industry and its customers. OG&E respectfully requests the Commission consider these comments in its decision-making process regarding this NOI. We look forward to engaging in the discussion that this NOI facilitates.

Western Farmers Electric Cooperative (WFEC)

WFEC provided the following responses to the NOI.

Part A, Question 1:

Advantages and disadvantages of generating nuclear energy in this state, including, but not limited to, the economic and environmental impacts

Having a diverse energy sector within the state is important for reliability and affordability. The advantages of nuclear energy in this state include the potential for low operating costs (3 to 4 cents per kilowatt-hour [kWh]) when compared to current fossil fuel generation costs (4 to 6 cents per kWh, depending on fuel price) and zero carbon emissions. The disadvantages include the following:

Base-load units do not align well with current energy market operations (i.e., Southwest Power Pool [SPP]) with cheaper fuel alternatives,

The potential for high and unknown capital costs (\$18,000/MW) when compared to current fossil fuel generation costs (\$2,000/MW),

An aging workforce,

Nuclear waste management challenges, and

The strict regulation of nuclear energy.

Part A, Question 2:

Methods to maximize existing workforce and products made in this state for the construction of nuclear energy generation facilities

One method to increase the workforce would be to develop partnerships with state higher education institutions and career technical centers to offer programs that are related to nuclear generation and attract potential students by demonstrating sufficient employment opportunities for graduates. Offering federally or state-funded incentives can attract students to these career paths. Offering similar incentives could open paths for military retirees or veterans who have served in U.S. Navy or comparable nuclear programs to return to the workforce. These programs are more technical than traditional generation, and it could take up to 10 years to develop an adequate workforce for nuclear generation facility operations and maintenance.

Gaining certification for products to be used in nuclear facilities takes time and regulatory effort. With respect to which products the state wants to manufacture and where, as well as which regulatory requirements must be met, many decisions will need to be made before additional comments and suggestions can be adequately stated.

Part A, Question 3:

Design characteristics, including recommendations for design specification and site selection

SMRs in the capacity range of 5 to 300 MW are most likely. In terms of site selection, the eastern portion of the state offers more available water resources. Although air-cooled condensing can be accomplished with a 6-percent reduction in power output, it requires much greater land usage. Transmission availability and congestion must be addressed to transmit the electricity to the load within Oklahoma.

Part A, Question 4:

Environmental and ecological impacts

Positive impacts include net-zero carbon emissions, low life-cycle emissions, and high energy density output with a relatively small footprint.

Negative impacts include nuclear waste production, increased water usage, increased land usage, the potential risk of accidents that have occurred elsewhere (globally), nuclear proliferation, the impacts of uranium mining and processing, and the need to meet requirements for decommissioning at the plants' end of life.

Part A, Question 5:

Land and siting criteria, including specific geographic areas that are best suited for new nuclear generation, as well as cities near military bases that may use new nuclear electric generation to meet the military resiliency requirements of 10 U.S.C., Section 2920

Land and siting criteria will depend on the technology selected (e.g., advanced traditional reactors such as the Westinghouse AP-1000, SMRs, or microreactors). Each of these technologies has different requirements for land use and siting, so decisions related to siting criteria would need to follow once the preferred technology has been determined.

Outside of Tinker Air Force Base, most military base loads within Oklahoma are below 50 MW.

Part A, Question 6:

Safety criteria

Western Farmers does not have a response at this time. Many unknown factors and criteria would need to be vetted before a recommendation can be provided.

Part A, Question 7:

Engineering and cost-related information

Nuclear plants have traditionally been extremely capital intensive, with costs routinely far exceeding those of traditional fossil-fuel-generating plants or renewable energy facilities. Coupling these historically high costs with relatively unproven technologies could drive up construction and operating costs. The last new nuclear technology that was put into commercial operation in the United States cost approximately \$16,000 per kilowatt (kW); adjusted for inflation, current costs are estimated at \$20,000/kW. That is about 8 to 10 times the cost of traditional thermal or fossil fuel generation. Ultimately, a 1,000 MW nuclear facility would be

difficult to finance without significant state and federal funds or grants. Additionally, most modern designs have not been proven on a large scale, and most have not received approval from the NRC.

Part A, Question 8:

Small modular nuclear reactor and microreactors capability

See response to question 7 above.

Part A, Question 9:

Socioeconomic factors, including, but not limited to:

- a. workforce education, training, and development;***
 - b. local and state tax base;***
 - c. supply chain capability;***
 - d. permanent and temporary job creation;***
 - e. timeline for development, including areas of potential efficiencies and potential leveraging of existing facilities within this state;***
 - f. literature review of studies that have assessed the impact of nuclear energy generation; and***
 - g. policy recommendations to support nuclear energy generation, including a survey of federal programs to financially assist the development of a nuclear project in this state.***
- a. The first challenge that needs to be overcome is to develop the next workforce generation to operate and maintain these units. Getting state colleges and career tech institutions involved early will be key to success in developing the workforce or partnering with companies that already have nuclear workforces, including the U.S. Navy, Tennessee Valley Authority, Entergy, Constellation, and others. A traditional generating facility can take up to approximately 6 years to plan, permit, build, and reach commercial operations. It is presumed that a nuclear energy facility would take longer (at least 10 years) to plan, permit, build, and reach commercial operation.
 - b. These plants should provide a benefit to local tax bases.
 - c. The nuclear supply chain will need to be hardened to handle the additional volume of these new facilities. Some of the supply chains will need to be redeveloped because some of the companies vying to develop their plans have not built these parts in the past. The nuclear supply chain is much more complicated than the regular supply chain due to heavy NRC regulations. Additionally, there is currently a lack of domestic mining for the fuel source, which creates additional dependence on international sources until further development of these mining operations can be achieved.

- d. It is presumed that many temporary jobs will be created during construction, and several permanent jobs will be created to operate and maintain the facilities. How many permanent jobs will be available remains to be determined and will depend on many factors.
- e. There are no existing nuclear energy facilities within the state, which is a challenge. There are currently at least 28 states that can leverage experience with nuclear facilities. It is presumed that Oklahoma does not have any (or little) expertise within its borders because of the lack of currently existing facilities.
- f. No comments currently.
- g. Currently, there are tax credits available, but if the facilities are not in the queue for construction already, they will most likely miss out on current tax credit incentives unless the credits are extended or revised.

Part B, Question 1:

What are the appropriate regulatory oversight mechanisms?

- a. ***Which Oklahoma agencies are most appropriate to regulate nuclear energy Comments of Public Service Company of Oklahoma facilities, which may or may not include using existing or new agencies?***
- b. ***How do other states regulate/oversee nuclear energy generation?***
- c. ***In other states, how are those regulatory agencies funded (e.g. general appropriations, annual assessment, etc.)?***
- d. ***What specific areas related to nuclear generation will require state regulatory oversight?***
- e. ***Which federal agencies regulate nuclear energy facilities, and what is the extent of their oversight authority?***

The AEA grants the federal government authority to regulate nuclear facilities primarily through the NRC. The NRC is responsible for licensing and regulating nuclear power as well as setting standards for radiological safety and operations.

States are authorized to oversee the following:

Moratorium: Many states have laws restricting or banning new nuclear construction, often due to concerns over spent nuclear fuel disposal.

Siting and Taxation: States and local governments can influence where nuclear plants are built through zoning and taxation policies.

Environmental Review: State agencies can conduct their own environmental impact reviews, which can affect the siting of nuclear facilities.

Economics and Policy: States can develop policies related to the electricity grid, including renewable portfolio standards that may include or exclude nuclear power, and can pass laws affecting electric companies operating nuclear facilities.

Emergency Preparedness: States and local authorities have the responsibility and authority to create and coordinate emergency response plans for events that could affect areas outside the plant property.

Some states, known as Agreement States, have agreements with the NRC to regulate specific radioactive materials, such as those found in X-ray machines and some industrial or medical uses. However, even in Agreement States, the NRC retains its authority over commercial nuclear power plants and other key nuclear facilities.

Part B, Question 2:

Because the Commission is constitutionally charged with ensuring rates are fair, just, and reasonable, what actions can/should the Commission implement to minimize ratepayer risks associated with investment in nuclear generation?

The same processes should be used as for fossil fuel generation and/or any rate cases and ratemaking within Oklahoma.

Part B, Question 3:

To the extent it is found to be feasible to have nuclear energy generation in Oklahoma, what steps are required, and who would be responsible for coordinating among stakeholders to navigate the processes associated with attracting and developing a nuclear energy ecosystem?

Western Farmers respectfully requests clarification of “ecosystem” and/or “nuclear energy ecosystem” as stated and intended within the request for comments on this NOI.

Part B, Question 4:

What are the advantages and disadvantages for nuclear energy generation in Oklahoma relative to energy diversification, reliability, and/or sustainability?

Oklahoma and the United States must have an “all-fuel types” energy policy to diversify and maximize our energy sources and maintain reliability and affordability. Nuclear energy is just one piece of energy policy, as are fossil fuel, wind, solar, battery, hydro, hydrogen, and other sources. These energy policies should strongly consider reliability and affordability, especially within Oklahoma, because a majority of Oklahomans live at or below the national poverty level. The more diversified approach we take to all-fuel types with our energy generation and supply, the more we will shelter ourselves from having reliability, sustainability, and affordability issues in the future.

Part B, Question 5:

Describe the technical differences between nuclear fission and nuclear fusion, as well as associated public perceptions of each.

Nuclear fusion is generally safer than nuclear fission because it does not rely on a chain reaction that requires specific controls. Fusion is self-limiting, releasing a finite amount of energy

before stopping. Fission relies on chain reactions that must be controlled to avoid the potential for catastrophic results, such as meltdowns and runaway reactions.

Western Farmers appreciates the opportunity to provide comments on the NOI and supports the Commission's continued efforts to study the technical and legal feasibility of nuclear energy generation in Oklahoma pursuant to 17 O.S. § 803.

Occlusion Nuclear Solutions

Occlusion Nuclear Solutions provided the following responses to the NOI.

Part A, Question 1:

Advantages and disadvantages of generating nuclear energy in this state, including, but not limited to, the economic and environmental impacts

Occlusion Nuclear Solutions believes that Oklahoma is uniquely positioned to benefit from both modular subterranean nuclear reactors (Deep Fission) and deep borehole nuclear waste disposal (Deep Isolation).

Advantages:

- Low-cost, clean baseload power (1.294 cents per kWh) to diversify Oklahoma's energy mix.
- Smaller footprint and reduced surface disruption compared to traditional plants.
- Opportunity to repurpose oil and gas workforce and supply chains for nuclear deployment.
- Strengthened military energy resiliency near Tinker, Altus, and Fort Sill.

Disadvantages:

- Regulatory uncertainty for novel subterranean reactors.
- Public perception challenges requiring proactive education.

Part A, Question 2:

Methods to maximize existing workforce and products made in this state for the construction of nuclear energy generation facilities

Our model uses proven oil-and-gas practices for drilling, casing, and cementing—skills already abundant in Oklahoma. We intend to source as many materials and services as practical from within the state, including casing, cement, and specialized drilling support. In addition, we plan to work with local universities and training programs to prepare Oklahoma's workforce for roles in canister placement, reactor emplacement, and AI-driven monitoring.

Part A, Question 3:

Design characteristics, including recommendations for design specification and site selection

We specialize in 1-mile-deep borehole reactors and >1 km deep canister placement for spent fuel. Oklahoma's geology—particularly in areas with thick, low-permeability formations—is well suited for both. Sites near military bases and heavy industry could benefit from co-location to enhance resiliency.

Part A, Question 4:

Environmental and ecological impacts

Subterranean designs minimize surface footprint and leverage natural geological containment. Our cementing process protects groundwater, while our AI and machine-learning monitoring platform provides continuous subsurface and surface environmental surveillance.

Part A, Question 5:

Land and siting criteria, including specific geographic areas that are best suited for new nuclear generation, as well as cities near military bases that may use new nuclear electric generation to meet the military resiliency requirements of 10 U.S.C., Section 2920

Ideal sites include:

- Deep, stable formations away from shallow aquifers,
- Those near existing transmission infrastructure,
- Locations near military bases to meet resiliency requirements (Tinker AFB, Fort Sill), and
- Low seismicity zones where borehole integrity can be ensured.

Part A, Question 6:

Safety criteria

Safety criteria would be met by the following and other measures:

Passive safety: natural radiation shielding from overlying rock.

No aboveground spent fuel pools.

A proactive end-of-life strategy: cement and seal boreholes to prevent future migration.

- Continuous real-time monitoring of pressure, temperature, and radiation in and around boreholes.

Part A, Question 7:

Engineering and cost-related information

Deep-borehole nuclear projects offer significant advantages over traditional aboveground facilities. By utilizing existing oil and gas drilling practices, modular emplacement techniques, and continuous monitoring, the approach substantially reduces the scale, complexity, and capital intensity of construction. Subterranean reactors and waste canisters require far less surface infrastructure, which lowers long-term operation and maintenance costs. Overall, this method has the potential to deliver nuclear power and waste disposal at a fraction of the cost of conventional nuclear facilities, while also enabling more predictable budgets and faster deployment timelines.

Part A, Question 8:

Small modular nuclear reactor and microreactors capability

Our borehole model is modular by design. Reactors and canisters are placed underground in scalable units, allowing phased deployment of energy generation or waste isolation.

Part A, Question 9:

Socioeconomic factors, including, but not limited to:

- a. workforce education, training, and development;***
- b. local and state tax base;***
- c. supply chain capability;***
- d. permanent and temporary job creation;***
- e. timeline for development, including areas of potential efficiencies, and potential leveraging of existing facilities within this state;***
- f. literature review of studies that have assessed the impact of nuclear energy generation; and***
- g. policy recommendations to support nuclear energy generation, including a survey of federal programs to financially assist the development of a nuclear project in this state.***

- Workforce education and training: Programs to transition oilfield workers into nuclear borehole operations.
- Local and state tax base: High-value infrastructure that increases local property and use taxes.
- Supply chain capability: Oklahoma manufacturing for casing, cement, and tools.
- Job creation: Hundreds of high-wage permanent monitoring and operations and maintenance jobs; thousands of temporary drilling and emplacement jobs.
- Timeline for development: Pilot operations: 2025–2026; commercial operations: 2026 onward for deep fission; 2027 onward for deep isolation.
- Policy recommendations: Establish state-level incentives, mirror federal DOE/NRC grant programs, and streamline permitting for subterranean nuclear facilities.

Part B, Question 1:

What are the appropriate regulatory oversight mechanisms?

We recommend leveraging existing OCC authority for subsurface operations, in coordination with the Oklahoma Department of Environmental Quality (DEQ) for environmental oversight and the DOE/NRC for nuclear safety. A joint task force (similar to oil and gas plus environmental regulatory task forces) could coordinate approvals.

Part B, Question 2:

Because the Commission is constitutionally charged with ensuring rates are fair, just, and reasonable, what actions can/should the Commission implement to minimize ratepayer risks associated with investment in nuclear generation?

Subterranean reactors reduce upfront capital expenditures compared to traditional plants. Modular deployment allows a “pay-as-you-grow” approach and incremental financing, reducing potential cost overruns.

Part B, Question 3:

To the extent it is found to be feasible to have nuclear energy generation in Oklahoma, what steps are required, and who would be responsible for coordinating among stakeholders to navigate the processes associated with attracting and developing a nuclear energy ecosystem?

- Establish a joint state and federal working group (OCC, DEQ, DOE, NRC).
- Incentivize public/private pilot projects.
- Create a nuclear workforce training program in partnership with Oklahoma State University (OSU), the University of Oklahoma (UO), and the University of Tulsa (TU).
- Designate suitable sites and pre-clear them for nuclear borehole use.

Part B, Question 4:

What are the advantages and disadvantages for nuclear energy generation in Oklahoma relative to energy diversification, reliability, and/or sustainability?

Advantages: clean baseload power, reduced reliance on gas peakers, enhanced grid resilience.

Disadvantages: initial public skepticism, need for new regulatory pathways.

Part B, Question 5:

Describe the technical differences between nuclear fission and nuclear fusion, as well as associated public perceptions of each.

- Fission (our focus): Splitting heavy atoms (uranium/plutonium) to release energy. Commercial and proven but produces long-lived waste. Public perceives fission as risky due to historic accidents.
- Fusion: Combining light atoms (hydrogen isotopes). Promising but still in experimental stage; produces little/no long-lived waste. Public perceives it as “cleaner” but not yet commercially viable.

City of Mangum, Resolution No. 1231-01

The City of Mangum provided the following responses to the NOI.

RESOLUTION NO. 1231-01

A RESOLUTION OF THE BOARD OF COMMISSIONERS FOR THE CITY OF MANGUM EXPRESSING THE CITY OF MANGUM'S SUPPORT OF NUCLEAR ENERGY DEVELOPMENT IN OKLAHOMA, INCLUDING SMALL MODULAR REACTORS AND MICROREACTORS, AND PROVIDING PUBLIC COMMENT TO THE OKLAHOMA CORPORATION COMMISSION'S NOTICE OF INQUIRY DATED AUGUST 27, 2025, AS AUTHORIZED BY THE OKLAHOMA ENERGY INITIATIVE ACT, 17 O.S. § 803.

Whereas, on June 9, 2025, the Governor signed Senate Bill 130 into law;

Whereas, Senate Bill 130 entitled the "Nuclear Energy Initiative Act" and codified in Title 17, section 803 of the Oklahoma State Statutes directed the Oklahoma Corporations Commission (OCC) "to conduct a feasibility study on nuclear generation in the State" no later than March 9, 2026;

Whereas, on August 27, 2025, the OCC issued a "Notice of Inquiry" (NOI) requesting interested persons to provide comments on case no. GD2025-000004.

Whereas, the NOI specified that the OCC will hold a public meeting on January 7, 2025, at 1:30 pm where it will "consider the issues presented and the comments received in this NOI."

Be it Resolved, by the Board of Commissioners for the City of Mangum as follows:

§ 1. The City of Mangum formerly declares its interest in and support of the responsible siting and development of one or more small modular reactors or microreactors within and adjacent to Greer County, Oklahoma and to sell excess clean power to neighboring communities, cooperatives, and industries.

§ 2. The implementation of nuclear power generation facilities in rural areas provides local economic advantages, including increased wages, tax revenue, and other ancillary economic impacts to local communities.

§ 3. Small-town nuclear projects have shown to be successful in several locations throughout the United States. For example, in Burlington, KS, a town whose population is close to Mangum's, generates approximately \$165 million annually to the local economy. Likewise, in St. Francis, LA, whose population is half of Mangum's, created 675 jobs while cutting over 12 million metric tons of carbon dioxide. Other examples of the positive impact nuclear power has on rural communities can be found at <https://tinyurl.com/5x7esbz5>.

§ 4. Greer County, Harmon County, Jackson County, and southern Beckham County once made up “Greer County, Texas.” Therefore, Greer County and its surrounding areas never belonged to a historical Indian reservation, and simplified the implementation of land rules.

§ 5. Approximately 78,800 people live within a 60-mile radius of Mangum, OK, providing a sufficient workforce to operate nuclear power plant.

§ 6. Greer County has a population density of 8.6 people per square mile compared to 1,159 people per square mile for Oklahoma County. Therefore, Greer County has sufficient land available without displacement or threat to nearby residential areas for the installation and operation of a nuclear power plant.

§ 7. The installation of a power source in Western Oklahoma will provide cheaper, more affordable electricity.

§ 8. The City of Mangum is located 32 miles from the Altus Air Force Base, 77.2 miles from Fort Sill Army Base, and 107 miles from Sheppard Air Force Base, making it a strategic location to provide nuclear power to three military installations.

§ 9. The City of Mangum possesses the land, existing transmission access, a skilled workforce, and strong community support for economic development that makes it an ideal candidate for an advanced nuclear project.

§ 10. The City of Mangum commits to working cooperatively with the Oklahoma Corporation Commission, the Oklahoma Department of Commerce, the U.S. Department of Energy, the Oklahoma Municipal Power Authority, and other large power customers to explore and advance nuclear power.

§ 11. The City Commission directs the City Manager, staff, or other designee to take all necessary preliminary steps, including but not limited to, site identification, feasibility study, grant applications, and outreach to qualified developers.

§ 12. The City Clerk is directed and authorized to transmit this Resolution to the Oklahoma Corporation Commission at Oklahoma Corporation Commission Court Clerk, Will Rogers Memorial Office Building, 2401 North Lincoln Boulevard, Oklahoma City, OK 73105 or by email at okcfilings@occ.ok.gov referring to Case No. GD2025-000004, to Governor Stitt, members of Oklahoma Congressional delegation, and to any advance nuclear developer expressing interest in Oklahoma.

Passed and Approved by the Board of Commissioners for the City of Mangum, this 31st Day of December 2025.

Generation Atomic

Generation Atomic provided the following responses to the NOI.

Subject: This document serves as formal comments submitted by Generation Atomic regarding the Oklahoma nuclear energy feasibility study as directed by Senate Bill (“SB”) 130, 17 O.S. § 803. Generation Atomic is a 501(c)(3) organization advocating for nuclear power.

Part A: Statutory Requirements

1. Advantages and disadvantages of generating nuclear energy in this state, including, but not limited to, the economic and environmental impacts.

Environmental Advantages

Nuclear energy represents the largest source of emissions-free energy in the United States, accounting for over 45% of carbon-free electricity generation nationally and avoiding 437 million metric tons of carbon emissions in 2023. For Oklahoma specifically, which currently generates approximately 50% of its electricity from natural gas and 42% from wind as of 2024, nuclear energy could provide a pathway to further reduce greenhouse gas emissions while maintaining grid reliability. Oklahoma produces almost three times more energy than it consumes, ranking eighth in the nation in total energy production, and advanced nuclear generation could enhance the state’s position as a net energy exporter while reducing environmental impact. Nuclear power plants produce minimal air pollutants compared to emissions from the oil and gas industry.

Beyond emissions reductions, nuclear energy offers significant advantages in land use and mineral efficiency compared to other energy sources. First, nuclear energy requires the least amount of land of any energy source. A nuclear energy facility requires only about 1.3 square miles per 1,000 megawatts of energy, which is 31 times less land than solar facilities and 173 times less than wind farms for the same power output. Further, recent analyses demonstrate that the mining footprint of nuclear energy is approximately 30% and 23% that of utility-scale solar PV and onshore wind. Nuclear plants also consume significantly fewer critical materials per gigawatt-hour compared to solar, wind, and battery technologies, which could help insulate Oklahoma’s energy transition efforts against supply chain disruptions and commodity price volatility. For a state like Oklahoma with substantial existing wind capacity, adding nuclear power to the energy mix would enable continued clean energy growth without requiring vast additional land areas or intensive mining operations, preserving Oklahoma’s natural landscapes and agricultural lands while meeting growing electricity demand.

Energy Security and Grid Reliability

Nuclear power plants provide a stable, continuous source of electricity, significantly enhancing energy security in Oklahoma by reducing vulnerability to energy supply disruptions and price fluctuations. Unlike fossil fuel sources that depend on continuous fuel deliveries and are

susceptible to supply chain disruptions, geopolitical tensions, and transportation bottlenecks, nuclear facilities can stockpile fuel on-site for 18-24 months of operation, providing substantial operational independence. Uranium resources are geographically diverse, reducing concentration risk. This stands in notable contrast to other energy technologies: China currently dominates over 80% of global solar panel manufacturing across all stages (polysilicon, wafers, cells, and modules), and controls 50-70% of global lithium and cobalt refining and 90% of rare earth element processing- critical materials for solar, wind, and battery technologies. Fuel costs represent only a small fraction of nuclear electricity costs (typically 5-10%), making nuclear power largely insulated from the fuel price volatility that affects natural gas and coal generation. For Oklahoma's energy mix, nuclear power could provide reliable baseload generation that works alongside the state's wind capacity and natural gas infrastructure, contributing to a diversified and resilient electricity grid that supports the state's long-term economic stability.

In 2024, U.S. nuclear plants achieved a 92% capacity factor, demonstrating their effectiveness as a 24/7 clean energy source. Nuclear power also strengthens grid reliability during extreme weather events- a critical consideration given Oklahoma's exposure to severe storms, ice events, and temperature extremes that have historically strained the grid. Nuclear plants maintain operation through such conditions, providing the backbone of grid stability when intermittent sources face challenges, and protecting both residential consumers and Oklahoma's vital industries, including data centers, manufacturing facilities, and agricultural operations that cannot afford power interruptions. A diversified energy portfolio is key to resilience, and nuclear power would complement Oklahoma's renewable energy sources, such as wind and solar, ensuring a balanced and reliable energy mix. Both American Electric Power and Oklahoma Gas & Electric, which serve Oklahoma, have established utility carbon goals that nuclear energy could support, and while nuclear power can impact the oil and gas industry, both industries can coexist and even benefit from diversification.

Economic Considerations

Nuclear energy presents significant economic opportunities for Oklahoma. Each of the 94 nuclear power reactors operating across the country employs between 500 to 1,000 full-time workers. These long-term positions offer higher wages *and* unionization rates than any other energy source and provide career stability for decades; most nuclear plants are licensed to operate for 60 years, with many extending to 80 years or more. Approximately 25% of nuclear workers are veterans, providing valuable employment opportunities for Oklahoma's significant veteran population. The industry's demand for skilled technical workers supports high-quality career pathways in engineering, operations, and maintenance.

Nuclear facilities require significant upfront capital investment, with construction timelines that have historically been longer than for natural gas facilities. However, recent developments demonstrate substantial progress in addressing these challenges. Advanced reactor designs, particularly small modular reactors (SMRs) and next-generation technologies, are specifically engineered to reduce both costs and construction timeframes through factory fabrication, standardized components, and streamlined construction processes. While the initial investment remains considerable, nuclear plants offer exceptional long-term value through 60 to 80 years or

more of reliable operation with relatively low fuel and operating costs, providing price stability and protection against fuel price volatility.

Multiple independent analyses project significant cost reductions for subsequent nuclear builds based on lessons learned from recent projects. A 2025 Department of Energy study found that the next U.S. AP1000 plants could see costs drop from initial levels to approximately \$10,000/kWe for the second build and \$6,200/kWe by the fourth build, representing reductions of 30% to 57%, with construction times potentially falling from over 10 years to 5.5-7 years. A 2024 MIT study analyzing the Vogtle 3&4 experience identified where these savings come from: experienced workers who know what they're doing, fixed supply chain problems, complete designs that don't change mid-construction, resolved licensing issues, and stable contractors. The MIT analysis projects overnight capital costs of \$8,300-\$10,375/kWe for the next two units with construction timelines of 80-96 months, ultimately reaching mature costs of \$4,625/kWe with 48-month construction schedules. This translates to levelized electricity costs of \$78-\$97/MWh with federal support or \$112-\$142/MWh without subsidies for near-term builds, dropping to \$66/MWh at mature deployment, competitive with current average U.S. electricity prices. While small modular reactors offer advantages in lower upfront financing requirements, the study found their long-term electricity costs remain approximately 45% higher than large reactors due to reduced economies of scale and higher operating costs per megawatt.

Given Oklahoma's abundant natural gas resources and existing infrastructure, nuclear would need to demonstrate competitive economics to justify investment, and evolving reactor technologies are making an increasingly strong case. While some large-scale nuclear construction projects have experienced challenges, the industry has systematically documented lessons learned and developed improved project management practices, standardized designs, and construction techniques that are being successfully applied to new projects.

Environmental Disadvantages

Some nuclear power plant designs require substantial water resources for cooling operations. Oklahoma has more man-made lakes than any other state in the nation and multiple rivers with hydroelectric facilities, but site-specific analysis would be needed to assess water availability. Hydroelectric power contribution varies depending on river levels, precipitation, and drought conditions, which could also affect nuclear plant cooling water availability.

Maximizing Oklahoma's Existing Workforce and Manufacturing Capabilities

Oklahoma's existing energy industry workforce provides a strong foundation for advanced nuclear energy development, positioning the state as a competitive location for nuclear projects. As a major natural gas and crude oil-producing state with extensive experience in complex energy operations, Oklahoma benefits from a workforce already possessing highly transferable skills in welding, instrumentation, process control, project management, and complex systems operations. These skills are directly applicable to nuclear facility construction and operation. This existing talent pool reduces the training timeline and costs typically associated with

developing a nuclear-ready workforce, providing Oklahoma with a significant advantage over states without comparable energy sector experience.

Oklahoma's substantial energy workforce represents a significant resource for nuclear energy development. According to the Energy Workforce & Technology Council's June 2025 report, Oklahoma's energy workforce totaled 48,329 workers, making it the third-largest energy workforce among the twelve states surveyed, behind only Texas (309,473) and Louisiana (53,029). This substantial workforce possesses directly transferable skills for nuclear energy projects. While the state has experienced recent workforce fluctuations- a decline of more than 1,400 workers since November 2024- this represents a transitional period shaped by changing economic forces and policy shifts, as noted by Energy Workforce President Molly Determan. This workforce transition period presents an opportunity for Oklahoma to strategically redirect energy sector expertise toward emerging clean energy technologies, including advanced nuclear. Workers experienced in oil and gas operations, renewable energy construction, grid integration, and energy systems management possess competencies directly applicable to nuclear facility projects. Cross-training initiatives could enable this existing energy workforce to support nuclear energy development, maximizing Oklahoma's human capital investments while creating stable, long-term employment opportunities that help reverse recent workforce declines.

The state has a valuable opportunity to leverage its manufacturing capabilities for nuclear component production. A comprehensive assessment of Oklahoma-based companies in relevant sectors (including precision manufacturing, advanced materials, heavy equipment fabrication, and specialized instrumentation) could identify immediate opportunities for state suppliers to participate in the growing nuclear supply chain. Many Oklahoma manufacturers already meet rigorous quality standards for the oil and gas industry that align closely with nuclear quality assurance requirements. Additionally, companies currently supplying components for energy infrastructure could potentially adapt their capabilities to meet nuclear component specifications. Strategic state procurement policies and supplier development programs could maximize participation by Oklahoma companies in nuclear projects while maintaining the necessary quality and safety standards, creating local jobs, and keeping economic benefits within the state.

Workforce development initiatives should build upon Oklahoma's existing strengths through partnerships among industry, educational institutions, technical colleges, and tribal nations. Establishing apprenticeship and certification programs specifically tailored to nuclear technology would ensure workforce readiness while creating clear career pathways for Oklahomans. The state's extensive experience in energy sector operations and training provides a proven foundation for adapting to nuclear workforce needs. Cross-training programs could enable workers with experience in traditional and renewable energy to transition into or simultaneously support nuclear roles, maximizing the state's existing human capital investments and providing career stability during industry transitions. Oklahoma's sizable energy workforce of over 48,000 workers demonstrates the state's capacity to support major energy projects, a capability that could be leveraged for nuclear development.

3. Design characteristics, including recommendations for design specification and site selection

Oklahoma should evaluate the full range of advanced nuclear technologies to determine which best meets the state's specific needs and applications. The selection of nuclear technology should be driven by actual energy requirements, grid integration needs, site characteristics, economic considerations, and intended applications rather than arbitrary size classifications or predetermined technology preferences. This flexible, needs-based approach ensures that the most suitable technology is matched to each particular use case, maximizing value for Oklahoma ratepayers and stakeholders.

The risks of imposing arbitrary restrictions on nuclear technology have been demonstrated in other states. In 2023, Illinois lifted its moratorium on nuclear construction but limited new facilities to reactors with a nameplate capacity of 300 MW or less, despite concerns from stakeholders. Within two years, four separate bills were introduced in the Illinois legislature seeking to modify these restrictions. While these efforts made progress in committees and received bipartisan support, they have not yet been successful, leaving Illinois potentially constrained in its nuclear energy options. Oklahoma can avoid this unnecessary regulatory burden by establishing technology-neutral policies from the outset, allowing appropriate regulatory agencies to evaluate each project based on its specific merits rather than requiring legislative action to remove arbitrary constraints that may later prove limiting.

Multiple advanced reactor designs are under development or approaching commercial deployment, each offering distinct advantages for different applications. Small Modular Reactors (SMRs) represent one promising category of advanced nuclear technology. SMRs are factory-manufactured and transportable, enabling standardized production, improved quality control, and reduced construction time and costs. These reactors incorporate passive safety features that enable automatic shutdown in the event of a malfunction, relying on natural forces like gravity and natural circulation rather than active mechanical systems. SMRs offer operational flexibility, produce manageable amounts of radioactive waste, and can be deployed incrementally to match growing energy demands.

Microreactors provide even greater flexibility for specialized applications requiring smaller-scale, portable power solutions. Their rapid deployment capability, minimal infrastructure requirements, and customization potential make them valuable for remote communities, industrial operations, data centers, and military installations requiring energy resilience under 10 U.S.C. Section 2920. Microreactors could be particularly well-suited for Oklahoma's rural and tribal communities and oil and gas field operations where traditional grid connections may be impractical or costly.

Advanced large-scale reactors, such as the recently built AP1000 in Georgia, may be appropriate for utility-scale baseload power generation, particularly where gigawatt-level capacity and decades of continuous operation are needed to serve major population centers and industrial loads. These designs benefit from economies of scale and can provide reliable grid stability that complements Oklahoma's existing generation portfolio. Experience with

successive builds of standardized designs demonstrates substantial improvements in cost and construction timelines as lessons learned are systematically applied, making large reactors increasingly competitive.

Other emerging technologies under development include high-temperature gas-cooled reactors, molten salt reactors, and fast reactors, each offering unique advantages in efficiency, waste reduction, industrial process heat applications, and operational characteristics. Some of these designs may prove particularly valuable for specific Oklahoma industries or applications that have not yet been fully evaluated.

Oklahoma's evaluation process should avoid imposing artificial constraints based on reactor size, design category, or technology maturity. Instead, the state should establish clear criteria based on economic viability, grid compatibility, site suitability, and stakeholder needs, then objectively assess which technologies best meet those criteria for each specific application. A site requiring reliable power for a remote community may have entirely different optimal technology characteristics than a site serving baseload power to Oklahoma City or providing process heat to an industrial facility.

4, 5, 6: Environmental and Ecological Impacts; Land and siting criteria; Safety criteria

Federal licensing requirements for nuclear facilities mandate comprehensive environmental impact analyses under the National Environmental Policy Act (NEPA). The Nuclear Regulatory Commission conducts thorough environmental reviews as part of the licensing process, examining potential impacts on air quality, water resources, land use, ecological systems, and surrounding communities. These analyses must address both construction and operational phases, including assessment of alternatives and mitigation measures. The NRC's environmental review process typically takes 24-36 months and includes multiple opportunities for public comment, including scoping periods and review of draft environmental impact statements before finalizing decisions. To improve efficiency and transparency for large infrastructure projects, the NRC participates in the FAST-41 process, which promotes early consultation, interagency coordination, and publicly tracked permitting milestones through the Federal Permitting Dashboard. Historically, environmental impact statements for nuclear facilities have frequently resulted in Findings of No Significant Impact (FONSI), reflecting rigorous environmental standards combined with the relatively minimal environmental footprint of nuclear power plants compared to their substantial energy output. This track record demonstrates that nuclear facilities can meet stringent environmental protection requirements while providing large-scale carbon-free electricity generation.

Site selection for nuclear facilities must consider multiple environmental factors, including proximity to transmission infrastructure and integration with the Southwest Power Pool regional grid, water resources for cooling systems, seismic activity and appropriate design requirements, population density for emergency planning purposes, transportation access for construction and fuel delivery, and environmental justice considerations ensuring equitable distribution of benefits and burdens across communities. For military installations requiring enhanced energy resilience under 10 U.S.C. Section 2920, Oklahoma's multiple military bases

could benefit from dedicated nuclear power sources. Advanced nuclear technologies, particularly microreactors, are specifically designed to meet these military energy security requirements with minimal environmental disruption.

Safety and emergency preparedness are carefully evaluated for each nuclear project, with reactor designs and siting criteria specifically tailored to address regional hazards. Nuclear power plants have demonstrated exceptional resilience in the face of extreme events, with robust designs that enable them to withstand natural disasters, including earthquakes, tornadoes, flooding, and

severe weather conditions. Following events like the 2011 Fukushima accident, the nuclear industry implemented comprehensive safety enhancements, including alternative cooling systems, environmentally qualified backup generators, protective shields against wind and flooding, and enhanced emergency preparedness measures. These improvements, combined with decades of operational experience, have resulted in a safety record that compares favorably to other energy sources. For Oklahoma specifically, susceptibility to tornadoes, severe weather, and occasional seismic activity will be thoroughly addressed through rigorous site evaluation and design standards established by the NRC. Emergency planning zones, evacuation routes, and coordination with Oklahoma Emergency Management and local agencies are integral components of the licensing process. Nuclear Regulatory Commission oversight ensures a comprehensive safety review, including physical security requirements designed to protect against both natural and man-made threats, environmental monitoring protocols during operation, and cybersecurity requirements for digital control systems. The industry's continuous safety improvements and proven ability to operate safely during extreme conditions, including the COVID-19 pandemic, when nuclear plants worldwide maintained operations without disruption, demonstrate the sector's commitment to protecting public health and safety.

7. Engineering and cost-related information;

[SEE PART A, SECTION 1: Economic Considerations]

8. Small modular nuclear reactor and microreactors capability

[SEE PART A, SECTION 3: Design characteristics, including recommendations for design specification and site selection]

9. Socioeconomic Factors

a. Workforce Education, Training, and Development

Nuclear power plant construction and operation create high-skilled employment opportunities across multiple categories, including construction, operations, maintenance, engineering, and support services. Oklahoma's existing energy sector workforce possesses highly transferable skills directly applicable to nuclear facilities, including expertise in welding, instrumentation,

process control, project management, and complex systems operations developed through the state's extensive oil and gas industry.

Training programs would need to cover nuclear-specific topics, including radiation protection, reactor operations, nuclear safety culture, and regulatory compliance requirements. Universities, community colleges, and technical schools should partner with industry to provide both degree programs and vocational training pathways. Apprenticeship programs combining classroom education with hands-on experience offer proven methods for workforce development. Workforce needs vary by project phase, with construction requiring substantial numbers of skilled trades workers over multi-year periods, followed by smaller numbers of highly trained permanent operations staff.

Other US states have proposed and passed legislation to help address the growing demand for a nuclear workforce. Senate Bill 120 in Colorado, would have created a program in the

Department of Higher Education to help meet growing workforce demand in the nuclear sector and establish a grant program for higher education institutions. Texas Senate Bill 1535, signed into law earlier this year, creates a program for developing curriculum and partnerships to address nuclear energy workforce needs.

b. Local and State Tax Base

Nuclear facilities provide substantial long-term economic benefits to host communities and the state. Given their high capital value, nuclear plants typically generate significant property tax revenue to local jurisdictions, supporting schools, infrastructure, and municipal services. The construction phase generates sales tax revenue on equipment and materials, while ongoing operations provide stable tax revenue over the plant's operating life, typically 60-80 years with license extensions. This multi-generational tax base stability distinguishes nuclear facilities from other energy sources with shorter operational lifespans. Compared to equivalent natural gas facilities, nuclear plants typically provide significantly higher tax revenue due to higher capital investment per megawatt of generating capacity.

c. Supply Chain Capability

Oklahoma's existing industrial base includes capabilities relevant to nuclear construction including concrete production, steel fabrication, electrical equipment manufacturing, precision instrumentation, and heavy equipment production. The state's extensive experience with complex energy projects and precision manufacturing in aerospace and other industries provides a strong foundation for nuclear supply chain participation.

An assessment would need to identify specific Oklahoma suppliers capable of meeting nuclear quality standards and areas where supply chain development would be beneficial. Many Oklahoma manufacturers already meet rigorous quality standards for the oil and gas industry that align with nuclear quality assurance requirements. Strategic supplier development programs could maximize participation by Oklahoma companies in nuclear projects while

maintaining necessary quality and safety standards, creating local jobs, and retaining economic benefits within the state.

d. Permanent and Temporary Job Creation

A new advanced nuclear plant would create approximately 300 high-paying permanent jobs, with construction generating substantial additional temporary employment over multi-year construction periods. Economic multiplier effects demonstrate that each 100 nuclear jobs creates approximately 250 additional jobs in the broader economy through services, retail, housing, and other support sectors.

Construction phase employment would include skilled trades workers, engineers, project managers, quality assurance personnel, and support staff. Permanent operations phase positions would include reactor operators, maintenance technicians, engineers, security personnel, health physics specialists, and administrative staff. Nuclear plant jobs typically offer above-average compensation compared to other energy sector positions, helping retain skilled workers in Oklahoma.

e. Timeline for Development, Including Areas of Potential Efficiencies and Leveraging of Existing Facilities

Advanced nuclear project timelines vary by technology and regulatory pathway. Federal licensing processes include options for Early Site Permits (addressing siting issues in advance), Design Certifications (for standardized reactor designs), and Combined Licenses (integrating construction and operating approval). Advanced reactor developers are pursuing design certifications that would streamline subsequent project licensing.

Oklahoma could potentially accelerate timelines through several mechanisms. Early identification of preferred sites using the Early Site Permit process would resolve siting issues before project commitment. Streamlined state-level permitting through coordinated agency review could reduce administrative delays. Proactive stakeholder coordination, including public opinion polling and public hearings, would address potential concerns early in the development process. Leveraging existing energy infrastructure at conversion sites could significantly reduce site preparation requirements and construction duration.

Existing energy sites offer particular advantages for accelerated deployment. These locations already possess transmission interconnections, cooling infrastructure, industrial zoning, and communities familiar with power plant operations. A specific engineering assessment would be needed to evaluate individual sites for nuclear conversion feasibility, including structural adequacy, cooling water capacity, and transmission capacity.

f. Policy Recommendations to Support Nuclear Energy Generation, Including Survey of Federal Programs

Beyond the Low Carbon Initiative bill passed in 2024, several proposed and enacted bills across the United States offer valuable insights for developing a nuclear energy framework in

Oklahoma. These examples come from Generation Atomic’s extensive nuclear bill tracking efforts.

Policy Category	Recommendation	State Examples
Clean Energy Standards	Include nuclear in state clean energy definitions and portfolio standards	Indiana (SB0178): Defines nuclear as clean energy for funding programs Colorado (HB1040): Updates clean energy definitions to include nuclear Ohio (HB308): Includes nuclear as green energy in state law
Financial Incentives	Establish tax credits and grants to reduce development costs	Indiana (HB1007): Creates 10% tax credit for SMR manufacturing Michigan (HB4128): Establishes \$1/kWh tax credit for SMR power Tennessee (HB1133): Provides pollution control tax credits
Regulatory Reform	Streamline permitting and remove outdated restrictions	Texas (SB1105): Creates nuclear permitting officer position Utah (HB0249): Establishes nuclear development process and energy zones Washington (HB1018): Updates EFSEC regulations to include fusion facilities
Development Funding	Create state funding for project development and construction	Texas (HB14): Establishes three-tier funding with grants up to \$200M Kentucky (SB179): Creates \$10M grant program Indiana (SB0423/424): Develops SMR pilot with cost recovery
Workforce Development	Invest in education and training programs	Colorado (SB120): Creates higher education grant program Michigan (HB4125): Funds postsecondary nuclear programs Texas (SB1535): Develops workforce program through TWC
Coal-to-Nuclear Transition	Establish frameworks for repurposing coal facilities	Oklahoma (SB131): Prioritizes nuclear for coal replacement Indiana (HB1563): Studies nuclear at retiring coal sites
Utility Cost Recovery	Allow CWIP charges and development cost recovery	Missouri (HB50/376): Allows CWIP for facilities under 600MW Indiana (SB0424): Establishes pre-approval cost recovery framework
State Coordination	Create dedicated offices or task forces	Utah (HB0249): Creates Nuclear Energy Consortium Washington (HB1249): Establishes 13-member commission Hawaii (SB1588): Forms Nuclear Energy Task Force

Federal Support Programs:

The Department of Energy Loan Programs Office (LPO) provides loan guarantees for nuclear projects, substantially reducing financing costs by offering federal backing for private sector loans. This program can significantly improve project economics by reducing interest costs and enabling access to capital markets. As of October 2025, the LPO has lending authority of over \$200 billion, most of which is approved for nuclear projects.

Investment Tax Credits and Production Tax Credits available under the Inflation Reduction Act provide substantial financial support for zero-emission generation, including nuclear facilities. These credits can reduce effective capital costs by up to 40% and improve project returns, making nuclear more competitive in energy markets.

The Advanced Reactor Demonstration Program supports technology development and first-of-a-kind deployments of advanced reactor designs, helping bridge the gap between demonstration and commercial deployment through cost-sharing arrangements.

The Civil Nuclear Credit Program provides financial support recognizing the value of carbon-free baseload generation to grid reliability and clean energy goals.

Technical Assistance Programs through the Department of Energy national laboratories offer expertise for reactor development, siting studies, workforce development initiatives, and regulatory pathway navigation.

B. Ancillary Questions Related to Nuclear Energy Generation Beyond the Statutory Requirements (Part B)

1. Regulatory Oversight Mechanisms

a. Appropriate Oklahoma Agencies for Nuclear Energy Regulation

Nuclear energy regulation involves multiple jurisdictional levels, with the federal government maintaining primary authority over nuclear safety and security while states retain important regulatory roles in areas such as economic regulation, environmental permits, and land use. Oklahoma would need to determine which state agencies are best positioned to handle state-level regulatory responsibilities for nuclear facilities.

The Oklahoma Corporation Commission currently regulates electric utilities and could potentially extend its jurisdiction to include economic oversight of nuclear generation, including cost recovery, rate impacts, and prudence reviews. The Oklahoma Department of Environmental Quality handles state environmental permits and water quality issues that would apply to nuclear facilities. Oklahoma Emergency Management would coordinate emergency preparedness and response planning. Additional coordination may be needed with agencies handling land use, transportation, and workforce safety.

Whether Oklahoma should create a dedicated nuclear oversight office or distribute responsibilities among existing agencies depends on the scale of anticipated nuclear development and the complexity of regulatory requirements. Other states have taken different approaches based on their specific circumstances and the extent of nuclear generation within their borders.

b. How Other States Regulate Nuclear Energy Generation

States with existing nuclear facilities have developed varied regulatory frameworks reflecting their unique circumstances and policy priorities. Most states rely on existing utility regulatory commissions for economic oversight while coordinating with federal regulators on safety matters. Other states maintain dedicated nuclear safety oversight offices that conduct independent monitoring and inspections complementary to federal Nuclear Regulatory Commission activities.

States also vary in their approach to economic regulation of nuclear facilities. Utility commissions in states with competitive electricity markets handle nuclear oversight differently than those in traditionally regulated markets. Some states have established specific cost recovery mechanisms for nuclear construction, while others apply standard utility rate-making processes.

c. Funding Mechanisms for State Nuclear Regulatory Agencies

State nuclear oversight agencies utilize various funding mechanisms depending on their structure and scope of responsibilities. Common approaches include general appropriations from state budgets, annual assessments on regulated nuclear facilities, fee-based systems charging for specific inspections or licensing activities, and combinations of these methods.

States with dedicated nuclear oversight offices often fund these operations through assessments on nuclear plant operators, ensuring that regulatory costs are borne by the regulated entities rather than general taxpayers. Fee-based systems charge for specific services such as permit reviews or inspections, directly linking regulatory costs to the level of oversight required. Some states fund nuclear oversight through general appropriations as part of broader energy or environmental agency budgets.

d. Specific Areas Requiring State Regulatory Oversight

While federal agencies maintain primary jurisdiction over nuclear safety and security, states retain important regulatory authority in several areas relevant to nuclear generation. State oversight typically includes economic regulation through utility commission review of costs, rates, and prudence of utility investments in nuclear facilities.

Environmental permitting at the state level addresses water quality, air emissions for non-radiological releases, wastewater discharge, and compliance with state environmental standards. Land use and zoning authority remains with state and local governments, governing site selection and development approvals. Emergency preparedness planning and coordination involve state and local emergency management agencies working with federal regulators.

States may also exercise oversight regarding workforce safety for non-radiological hazards, transportation of non-nuclear materials and equipment, construction standards and building codes for non-safety-related structures, and tax assessment and collection. The specific scope of state oversight should be clearly defined to avoid duplication with federal authority while ensuring appropriate state interests are protected.

e. Federal Agencies and Their Oversight Authority

The Nuclear Regulatory Commission (NRC) holds primary federal authority for nuclear safety and security regulation. The NRC's jurisdiction includes reactor design certification, site licensing, construction permits, operating licenses, oversight of plant operations, enforcement of safety regulations, emergency preparedness requirements, physical security and safeguards, radiological health and safety, and decommissioning oversight.

The Department of Energy plays a significant role in nuclear technology development, providing research support, loan guarantees, and technical assistance but does not hold regulatory authority over commercial facilities. The Environmental Protection Agency sets radiation protection standards for public exposure and oversees certain environmental aspects of nuclear facilities. The Federal Emergency Management Agency coordinates with NRC on emergency

preparedness requirements and works with state and local governments on emergency planning. The Department of Transportation regulates the transportation of nuclear materials and spent fuel.

2. Commission Actions to Minimize Ratepayer Risks Associated with Nuclear Investment

The Oklahoma Corporation Commission's constitutional responsibility to ensure fair, just, and reasonable rates requires careful consideration of ratepayer protection mechanisms for nuclear investments. Several approaches can help minimize ratepayer risks while enabling potentially beneficial nuclear development.

Prudence reviews at key project milestones would allow the Commission to evaluate whether utility decisions and expenditures are reasonable before significant costs are incurred. This could include reviews at major decision points such as technology selection, site selection, contractor selection, and construction milestones. Regular monitoring and reporting requirements would provide transparency into project progress, costs, and any emerging issues.

Cost cap mechanisms could establish limits on ratepayer exposure, with utilities or shareholders bearing costs above specified thresholds. Performance incentives could reward utilities for completing projects on time and within budget while imposing penalties for significant overruns attributable to poor management. Phased cost recovery could defer some cost recovery until the plant is operational and demonstrating reliable performance.

Risk-sharing arrangements between utilities, contractors, and vendors could allocate financial risks appropriately among parties with control over different aspects of project execution. Contingency requirements could ensure adequate reserves are maintained for unexpected costs. Independent oversight and technical expertise, potentially through third-party engineering reviews, would provide the Commission with expert assessment of project status and risks.

Consideration of federal financing mechanisms such as Department of Energy loan guarantees and federal tax credits would reduce overall project costs and ratepayer burden. Clear standards for cost recovery eligibility would establish upfront expectations regarding which costs are recoverable and under what circumstances. These mechanisms should be tailored to Oklahoma's specific circumstances and the characteristics of any proposed nuclear project.

3. Steps Required and Coordination Responsibilities for Nuclear Energy Ecosystem Development

Should nuclear energy generation be found feasible in Oklahoma, developing a nuclear energy ecosystem would require coordinated efforts among multiple stakeholders. Key steps would include establishing a state nuclear energy task force or coordinating body bringing together relevant state agencies, utilities, potential developers, educational institutions, tribal nations, and other stakeholders.

Site identification and characterization would require geological surveys, environmental assessments, and evaluation of existing infrastructure. Regulatory framework development

would clarify state agency roles, permitting processes, and coordination mechanisms with federal regulators. Workforce development initiatives would need coordination among educational institutions, industry partners, and workforce development agencies to ensure adequate trained personnel.

Supply chain assessment and development would identify Oklahoma companies capable of participating in nuclear projects and address capability gaps. Infrastructure planning would ensure adequate transmission capacity, transportation access, and water resources. Community engagement and public education would build understanding and address concerns in potential host communities.

The Oklahoma Corporation Commission, given its existing authority over electric utilities and energy infrastructure, could play a central coordinating role. Alternatively, the Governor's office or a designated state energy office could provide overall coordination. The specific organizational structure should provide clear leadership while ensuring participation from all relevant stakeholders. Regular coordination with federal agencies including the Nuclear Regulatory Commission and Department of Energy, would be essential.

4. Advantages and Disadvantages for Nuclear Energy Generation Relative to Diversification, Reliability, and Sustainability

[SEE PART A, QUESTION 1]

5. Technical Differences Between Nuclear Fission and Nuclear Fusion

Nuclear energy production can rely on one of two fundamental atomic processes: fission and fusion. Fission involves splitting large atoms, typically uranium or plutonium, when struck by neutrons, creating a chain reaction that releases substantial energy used to heat water and generate electricity in current nuclear power reactors. Fusion, conversely, combines lighter atoms such as hydrogen to form heavier ones like helium, producing several times more energy than fission with fewer radioactive byproducts. While fission technology is well-established and widely deployed in commercial reactors worldwide, fusion is not commercialized and remains under active research due to the extreme pressure and temperature requirements needed to sustain the reaction.

Public perception of fission and fusion differs significantly, though both involve nuclear processes. Fission technology faces some public concerns related to reactor safety, radioactive waste management, and association with nuclear weapons, despite the excellent safety record of commercial nuclear power. Decades of safe operation and modern advanced safety features have helped build public confidence in many communities with existing nuclear facilities.

Fusion is often perceived more favorably by the public, viewed as a "clean" or "ideal" energy source because it produces less radioactive waste and cannot experience runaway chain reactions. However, fusion's theoretical nature and distant commercial availability mean public understanding of actual fusion technology and its challenges is limited. Some view fusion as a promising future technology, but not a near-term solution to current energy needs.

For Oklahoma's near-term energy planning, fission technology represents the only commercially available nuclear option. Advanced fission reactor designs incorporating modern safety features and improved economics should be the focus of a feasibility assessment. Fusion technology, while potentially promising for the distant future, does not currently offer a viable pathway for meeting Oklahoma's energy needs in the relevant planning timeframe.

Thank you for the opportunity to submit comments on the feasibility of nuclear energy in Oklahoma. If you have any questions regarding these comments, please do not hesitate to reach out at madison@generationatomic.org.

**Attachment C: “Advanced Nuclear Energy Economics”
Technical Conference Presentation
Presented by the Nuclear Energy Institute to the
Oklahoma Corporation Commission
October 21, 2025**

Advanced Nuclear Energy Economics

Oklahoma Corporation Commission

Nuclear Technical Conference

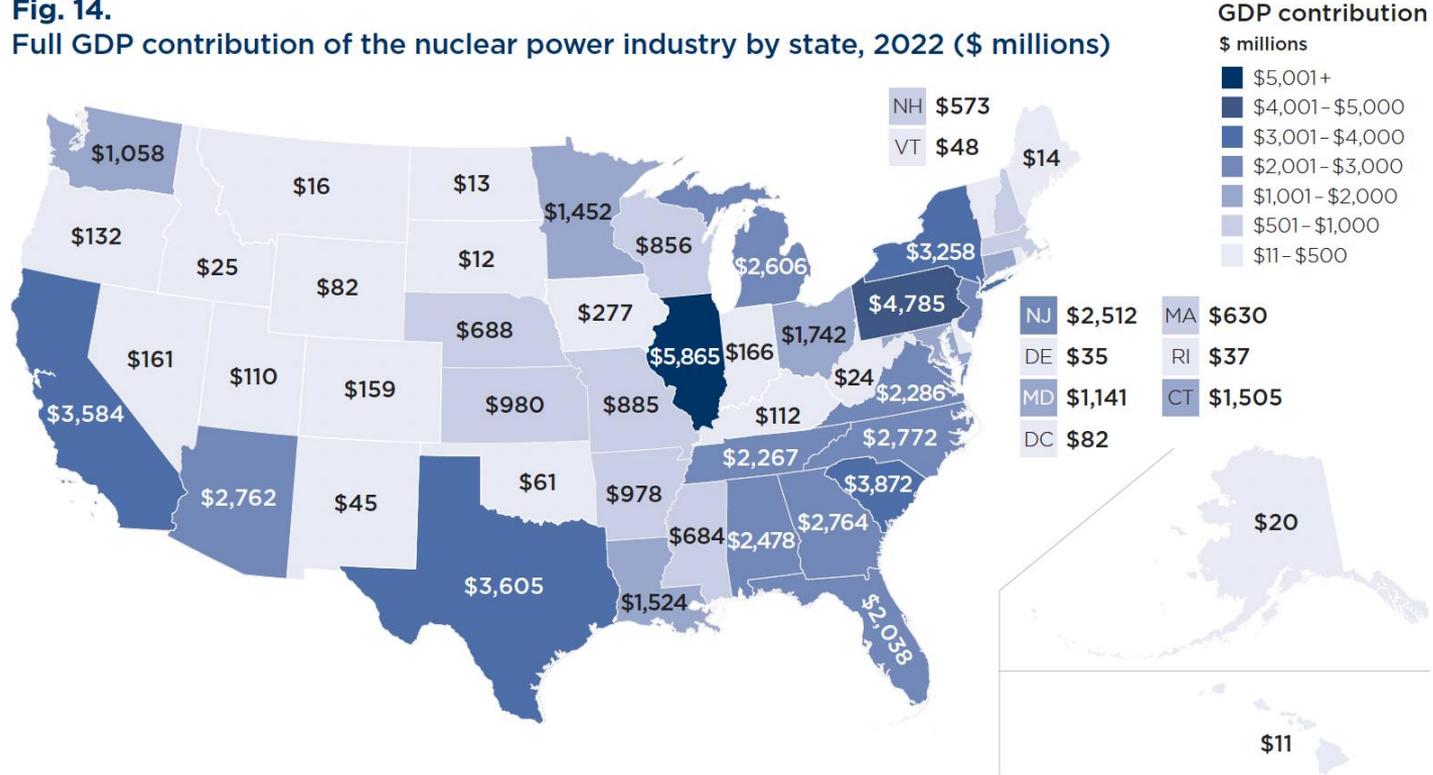
October 21, 2025

Marc Nichol



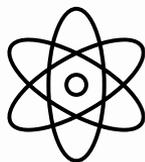
Economic Impacts of Nuclear in the U.S.

Fig. 14.
Full GDP contribution of the nuclear power industry by state, 2022 (\$ millions)



Lowest System Cost Achieved by Enabling Large Scale New Nuclear Deployment

Lowest Cost System

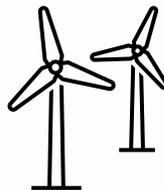


Nuclear is 43% of generation (>300 GW of new nuclear)

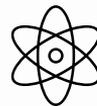


Wind and solar are 50%

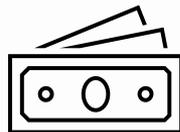
Energy System with Nuclear Constrained



Wind and Solar are 77% of generation



Nuclear is 13% (>60 GW of new nuclear)



Increased cost to customers of \$449 Billion

Both scenarios are successful in reducing electricity grid GHG emissions by over 95% by 2050 and reducing the economy-wide GHG emissions by over 60%

Federal Funding Opportunities for New Nuclear



Tax Credits

- PTC: At least \$30/MWh for 10 years
- ITC: 30% of investment
- Bonuses for energy communities and domestic supply

Loan Guarantees

- >\$250B in authority
- \$63B in Nuclear Applications (6/2024)

Fuel and Supply Chain

- HALEU Fuel - \$700M
- \$2.7 Billion for fuel (conditional on Russian import ban)

Demonstrations (Awarded)

- DOE funding 12 different designs, >\$5B over 7 years
- ARDP Demos, Risk Reduction, Early development

Deployments (New)

- \$800 Million for utility use of light-water SMRs

Other Support

- GAIN Vouchers
- NRIC Partnerships

September 2022

Current Federal Policy Tools to Support New Nuclear

The following is a list of current policy tools that could directly support the deployment of new nuclear, could potentially indirectly support the deployment or planning for new nuclear, and that currently support the deployment of new nuclear.

Programs that Could Directly Support Deployment of New Nuclear

Clean Electricity Production Credit – 45Y

The Inflation Reduction Act created a new technology-neutral tax credit for all clean electricity technologies, including advanced nuclear and power uprates that are placed into service in 2023 or after. The bill does not change the existing Advanced Nuclear Production Tax Credit but precludes credits from being claimed under both programs. The value of the credit will be at least \$30 per megawatt-hour, depending on inflation, for the first ten years of plant operation. The credit phases out when carbon emissions from electricity production are 75 percent below the 2022 level. The following is a link to the statutory language.

<https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title26-section45Y&num=1&edition=prelim>

Clean Electricity Investment Credit – 48E

As an alternative to the clean electricity PTC, the Inflation Reduction Act provided the option of claiming a clean electricity investment credit for zero-emissions facilities that is placed into service in 2023 or thereafter. This provides a credit of 30 percent of the investment in a new zero-carbon electricity facility, including nuclear plants. Like the other credits, this investment tax credit can be monetized. The ITC phases out under the same provisions as the clean electricity PTC.

<https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title26-section48E&num=1&edition=prelim>

Both the clean electricity PTC and ITC include a 10-percent point bonus for facilities sited in certain energy communities such as those that have hosted coal plants. The following is a link to the statutory language.

Credit for Production from Advanced Nuclear Power Facilities – 45I

The nuclear production tax credit 26 USC 45I provides a credit of 1.8 cents per kilowatt-hour up to a maximum of \$123 million per tax year for 8 years. Only the first 6000 MW of new capacity installed after 2005 for a design approved after 1999 are eligible for the tax credit. The credit does not include a direct pay provision, so the owner will need to have offsetting taxable income to claim the credit or transfer the credit to an eligible project partner. The following is a link to the statutory language.

<https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title26-section45I&num=1&edition=prelim>

State Policies – Economic Incentives (Examples)

- Support for Early Works
 - **North Carolina:** PUC approved \$440M for ESP, construction permit/license application, etc.
 - **Virginia:** Two bills to allow cost recovery for ESP and certain construction work in progress
 - **Washington:** Legislature allocated \$25 million to assist Energy Northwest’s LPO application
- Recovery of Costs During Construction
 - Georgia (for Vogtle Units), Indiana, North Carolina
- Recent Incentives
 - **Indiana:** 20% tax credit for SMR manufacturers
 - **Tennessee:** \$70M Nuclear Energy Fund for development and manufacturing
 - **Utah:** Nuclear eligible for 30% tax credit under “large-scale infrastructure projects”
 - **Kansas:** exempts new nuclear facilities from certain property taxes
- Other
 - Kentucky: \$20M to University of Kentucky for nuclear R&D

U.S. New Nuclear Deployment Plans

Over 40 GWe that may be in operation by early 2030s

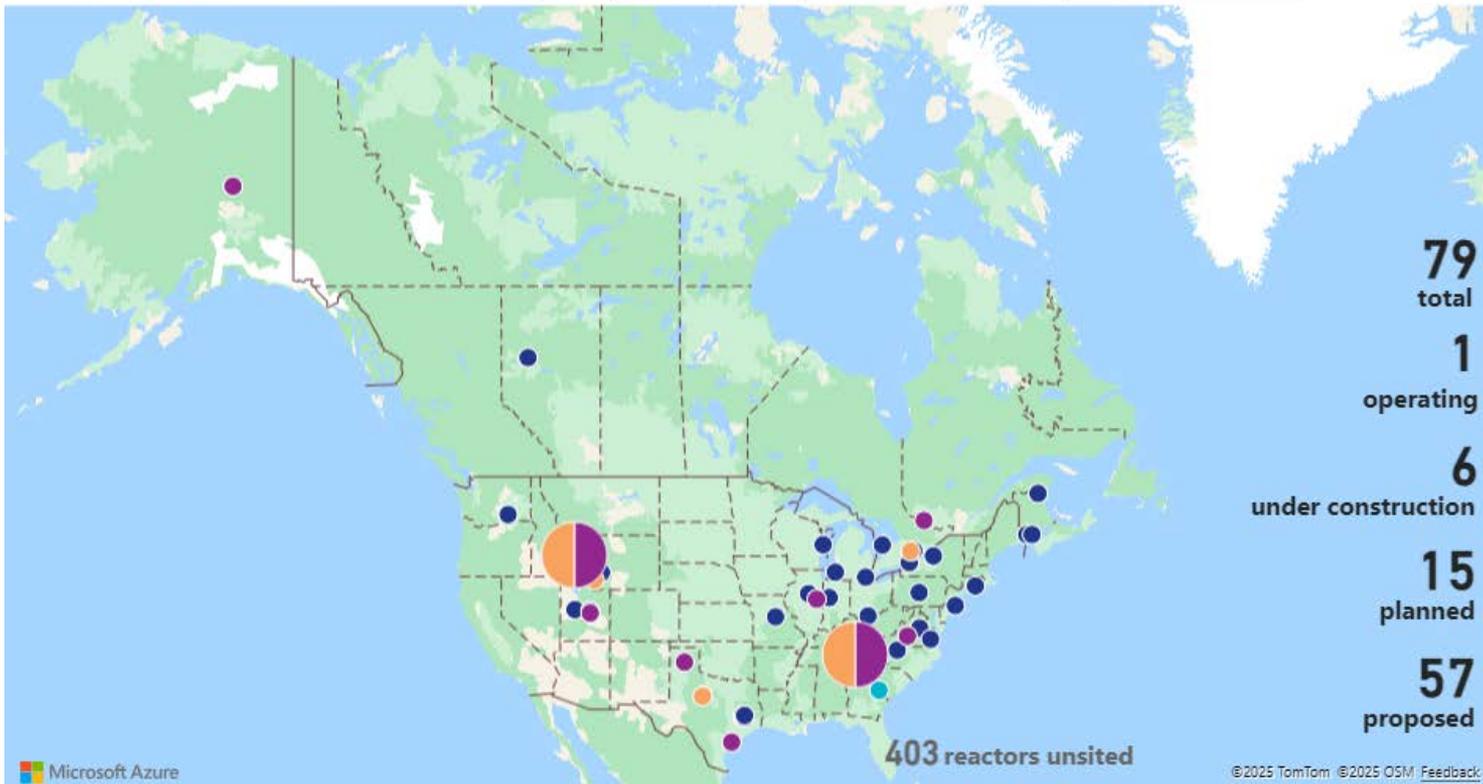


Status ● Proposed ● Planned ● Under Construction ● Operating

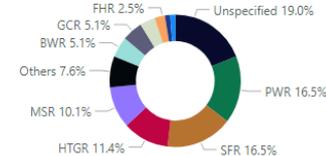
All



Projects



by Reactor Type



Updated 10/14/2025

©2025 Nuclear Energy Institute

QUESTIONS?

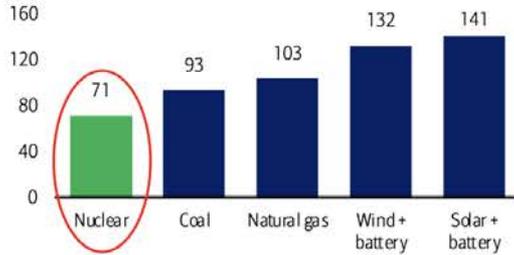


Nuclear Energy is Affordable

“Nuclear appears to be the cheapest scalable, clean energy source by far.”

Exhibit 20: Nuclear is cost-effective...

Cost of generation, different sources (\$/MWh)

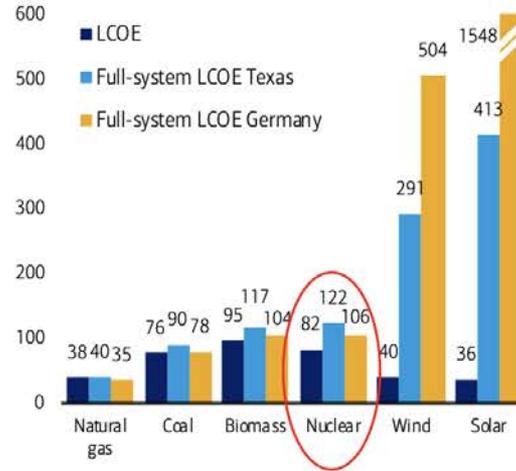


Source: BofA Research Investment Committee, Lazard, Entler, et al. (2018). Note: nuclear, coal, and natural gas price estimates from Entler, et al. Wind and solar cost estimates are from Lazard's 2023 Levelized Cost of Energy+ report. Wind + battery and solar + battery use estimates from California's Independent System Operator (CAISO) and assume a 4-hour lithium-ion battery storage system to account for firming costs. All cost estimates show unsubsidized costs.

BofA GLOBAL RESEARCH

Exhibit 21: ...especially on an “all-in basis”...

LCOE & LFSCOE calculations by energy source

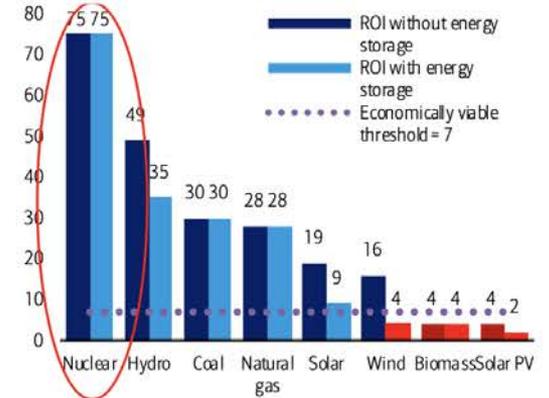


Source: BofA Research Investment Committee, Idel 2022

BofA GLOBAL RESEARCH

Exhibit 22: ...and has the highest energy ROI

Energy returned on energy invested, by source



Source: BofA Research Investment Committee, D. Weißbach, G. Ruprecht, A. Huke, K. Czerski, S. Gottlie, A. Hussein; Red signals EROI below economically viable threshold

BofA GLOBAL RESEARCH

System Benefits of Advanced Reactors

Long term price stability

- Low fuel and operating costs

Reliable dispatchable generation

- 24/7, 365 days per year, years between refueling (Capacity factors >92%)

Efficient use of transmission

- Land utilization <0.1 acre/TWh (Wind =1,125 acre/TWh; Solar 144 acre/TWh)

Environmentally friendly

- Zero-carbon emissions, one of lowest total carbon footprints
- Many SMRs are being designed with ability for dry air cooling

Integration with renewables and storage

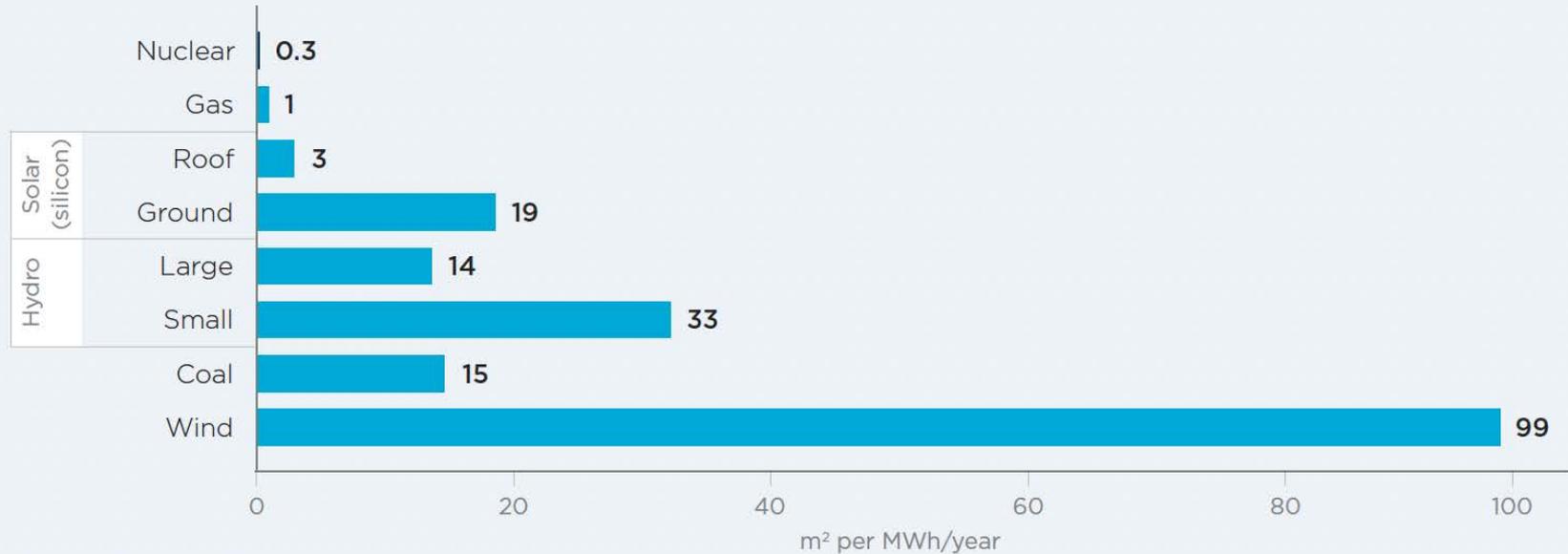
- Paired with heat storage and able to quickly change power

Black-start and operate independent from the grid

- Resilience for mission critical activities
- Protect against natural phenomena, cyber threats and EMP

Land Use Comparison of Energy Technologies

Fig. 16. Land use requirements of power generation technologies³¹

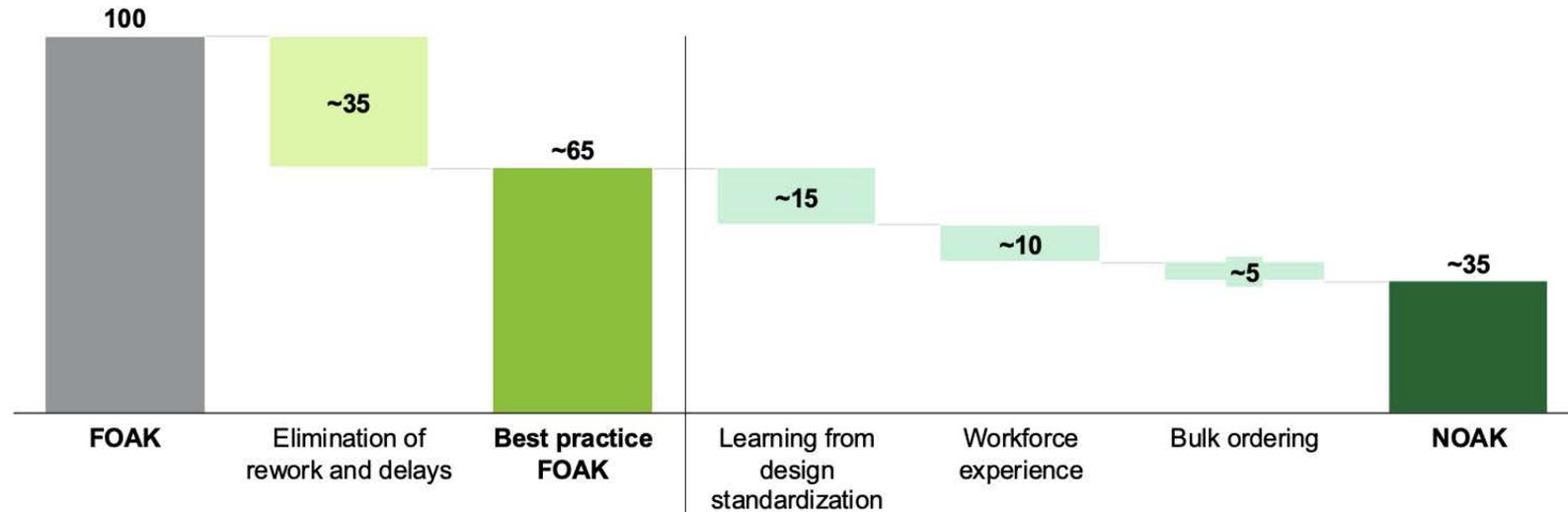


Source: Ritchie (2022)

DOE Liftoff Report

Figure 26: Investment in pre-construction planning and design standardization are essential for reducing costs

Relative impact of FOAK to NOAK cost reduction levers on overnight capital costs, \$/kW



Investing in pre-construction planning reduces costly rework and delays: ensuring design completion and constructor proficiency can reduce construction time and cost

Design standardization maximizes learning: multiple orders of a standardized design increase the ability to realize learning effects between projects

Vogtle 3&4 Experience

Construction

\$64.8 Billion

Economic output during construction, including

\$46.9 Billion

In Georgia and the Central Savannah River Area

21,000 jobs

Supported annually during construction

16,800 jobs

In Georgia and the Central Savannah River Area

Operations

\$3.9 Billion

Economic output during operations, including

\$2.5 Billion

In Georgia and the Central Savannah River Area

7,900 jobs

Supported annually during operations, including

3,500 jobs

In Georgia and the Central Savannah River Area

270 Million MTU

Carbon emissions avoided during initial 40 years license

Early Mover Success

Industry De-Risking

- Construction Best Practices
- Risk Registers
- Fast Follower Approaches
- Fleet Deployment Models

Federal Policies

- Tax Incentives
- Loan Guarantees
- Demonstration Cost Shares
- Early Mover Support

State Policies

- Energy Policy
- Reliability
- Economic Policy
- Sustainability
- Permitting
- Infrastructure

Large Customers

- Data Centers & AI
- Manufacturing
- Anchor Customers
- Higher Willingness to Pay

States Taking Action for Nuclear



Exploring Nuclear Technology with Studies, Working Groups, Commissions and Task Forces

Connecticut, Florida, Indiana, Kentucky, Louisiana, Maryland, Michigan, Montana, Nebraska, New Hampshire, Ohio, Pennsylvania, Tennessee, and Texas



Recognizing Nuclear as a Clean Energy Resource

Idaho, Michigan, Minnesota, North Carolina, Ohio, Tennessee, Utah, Virginia and Washington



Removing Barriers and Signaling Support

Repealing Nuclear Moratoriums: Connecticut, Illinois, Kentucky, Montana, West Virginia, and Wisconsin
Signaling Regulatory Support: Indiana, Mississippi, North Carolina, and South Dakota



Incentivizing Nuclear Technology and Supply Chain

Kentucky, Michigan, Tennessee, Virginia, Washington, and Wyoming

2025 Highlights

Legislative

- Texas
- Colorado, Kentucky, & New Hampshire (clean energy)
- Arkansas, Delaware, Hawaii, Louisiana, North Dakota, Oklahoma, Wisconsin (studies)
- Indiana, Missouri & North Carolina (cost recovery)

Governor/Energy Office

- New York
- Utah (regional coordination)
- Indiana
- Tennessee

PSC

- New Jersey
- Maryland
- Louisiana
- Kentucky

In state trainings for state stakeholders

State Options to Support Advanced Reactors

- Reliability Portfolio Standards
- Value-based market/regulatory system
- Tax incentives (e.g., property)
- Advanced cost recovery
- Workforce and infrastructure

State Policy Options: <https://www.nei.org/resources/reports-briefs/policy-options-for-states-to-support-new-nuclear>



Scan to view state policy options.

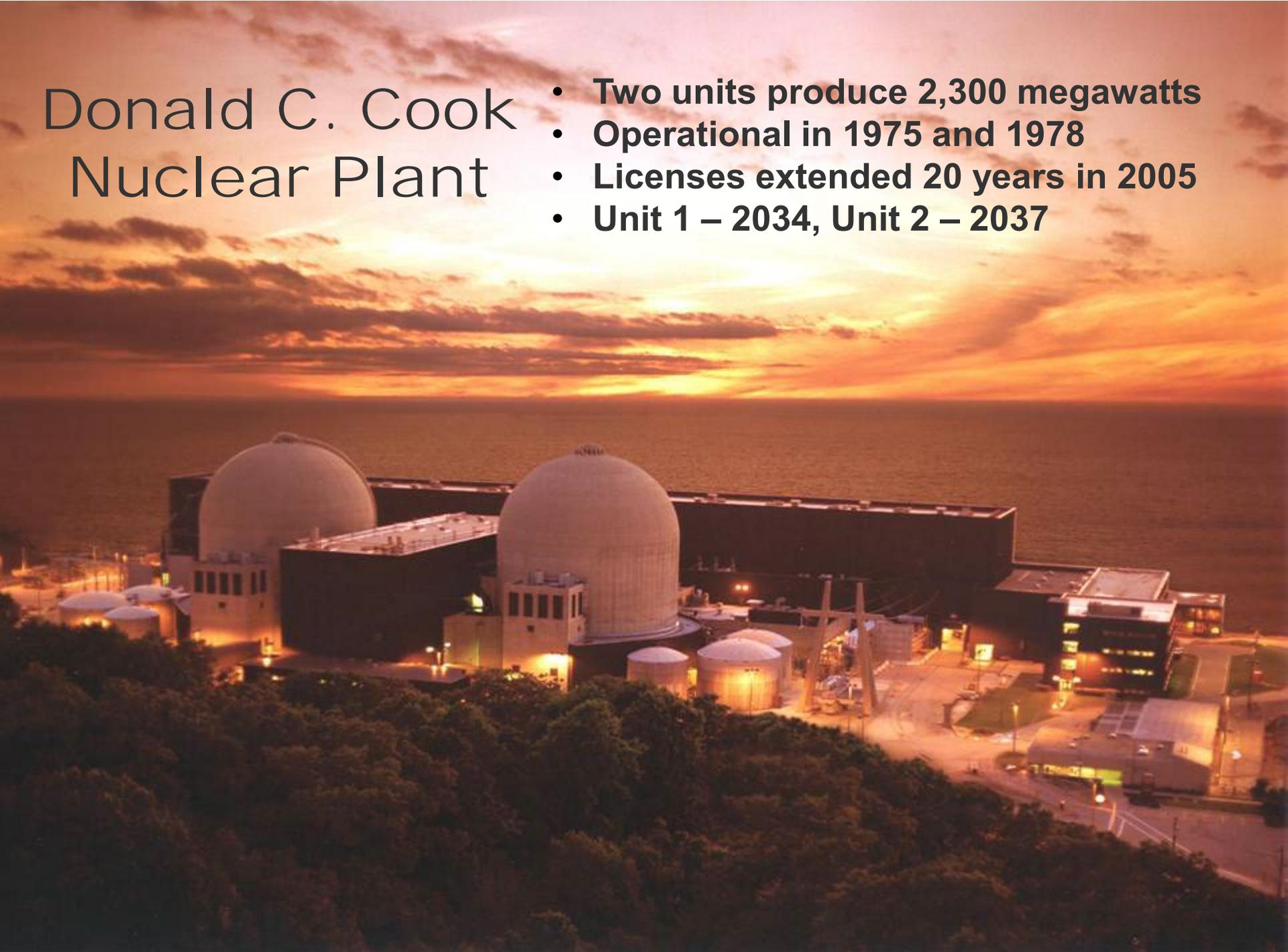


Source NARUC/NASEO: <https://pubs.naruc.org/pub/8C96325F-CF7E-90BE-F8B3-B07570F3953B>

**Attachment D: “Donald C. Cook Nuclear Plant”
Technical Conference Presentation
Presented by American Electric Power to the
Oklahoma Corporation Commission
October 21, 2025**

Donald C. Cook Nuclear Plant

- **Two units produce 2,300 megawatts**
- **Operational in 1975 and 1978**
- **Licenses extended 20 years in 2005**
- **Unit 1 – 2034, Unit 2 – 2037**





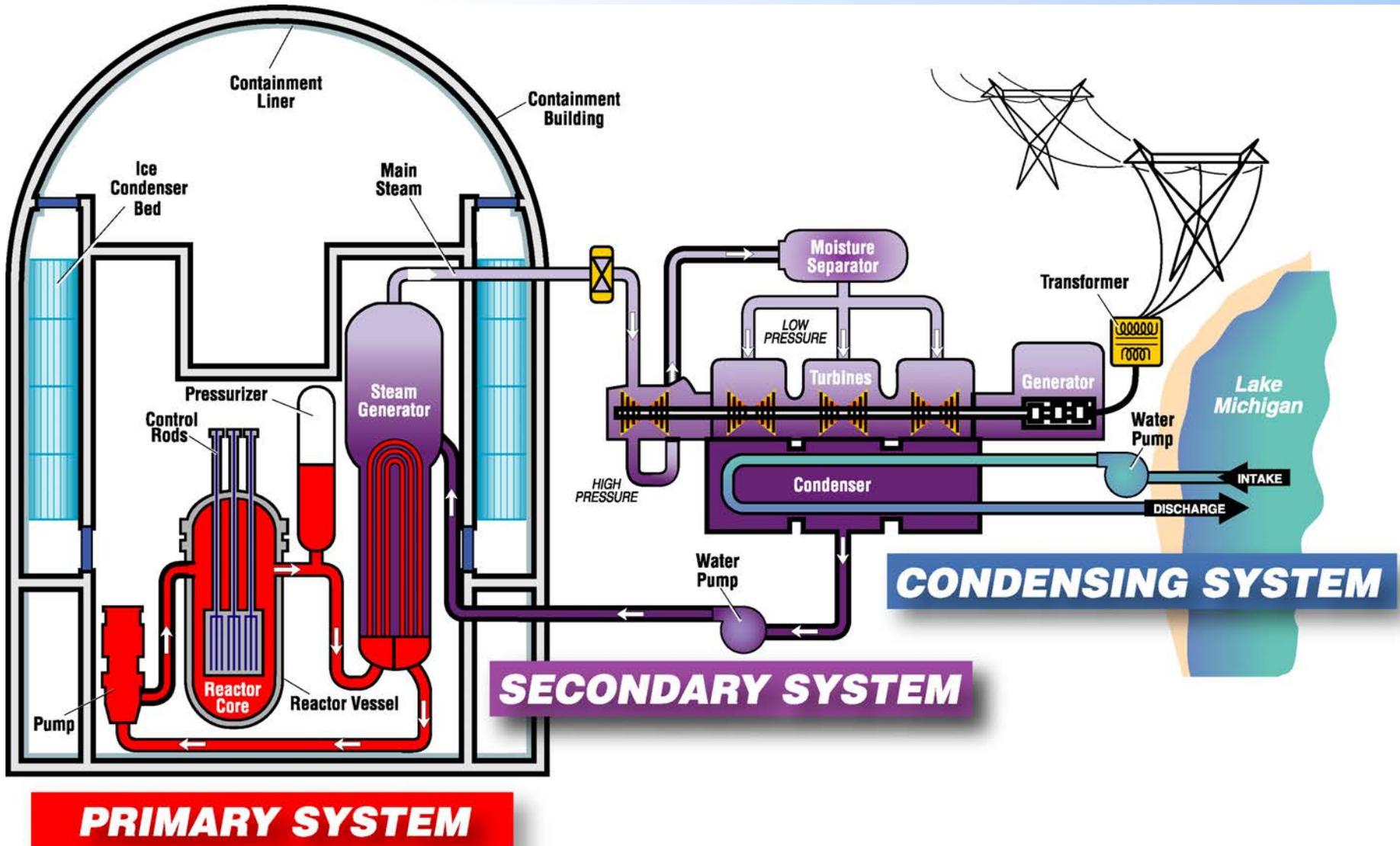
Vital Areas

Protected Area

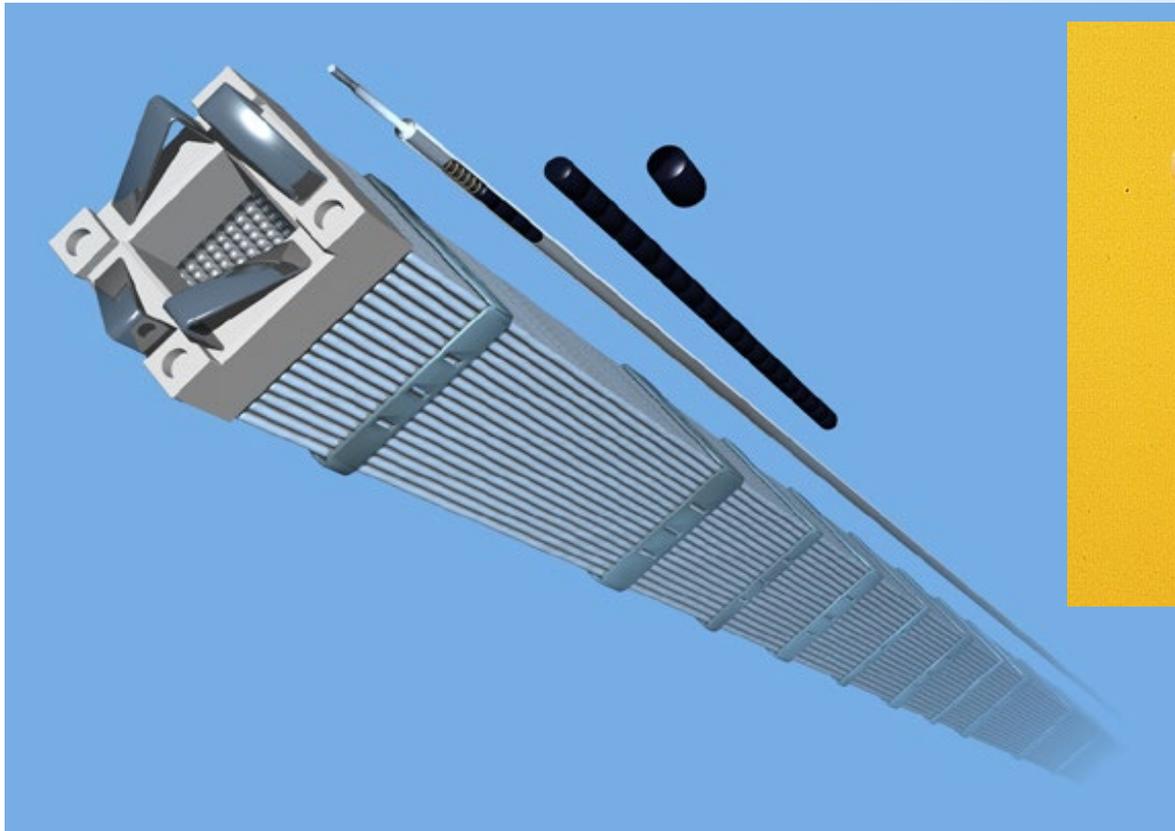
Progressively
Tighter
Security

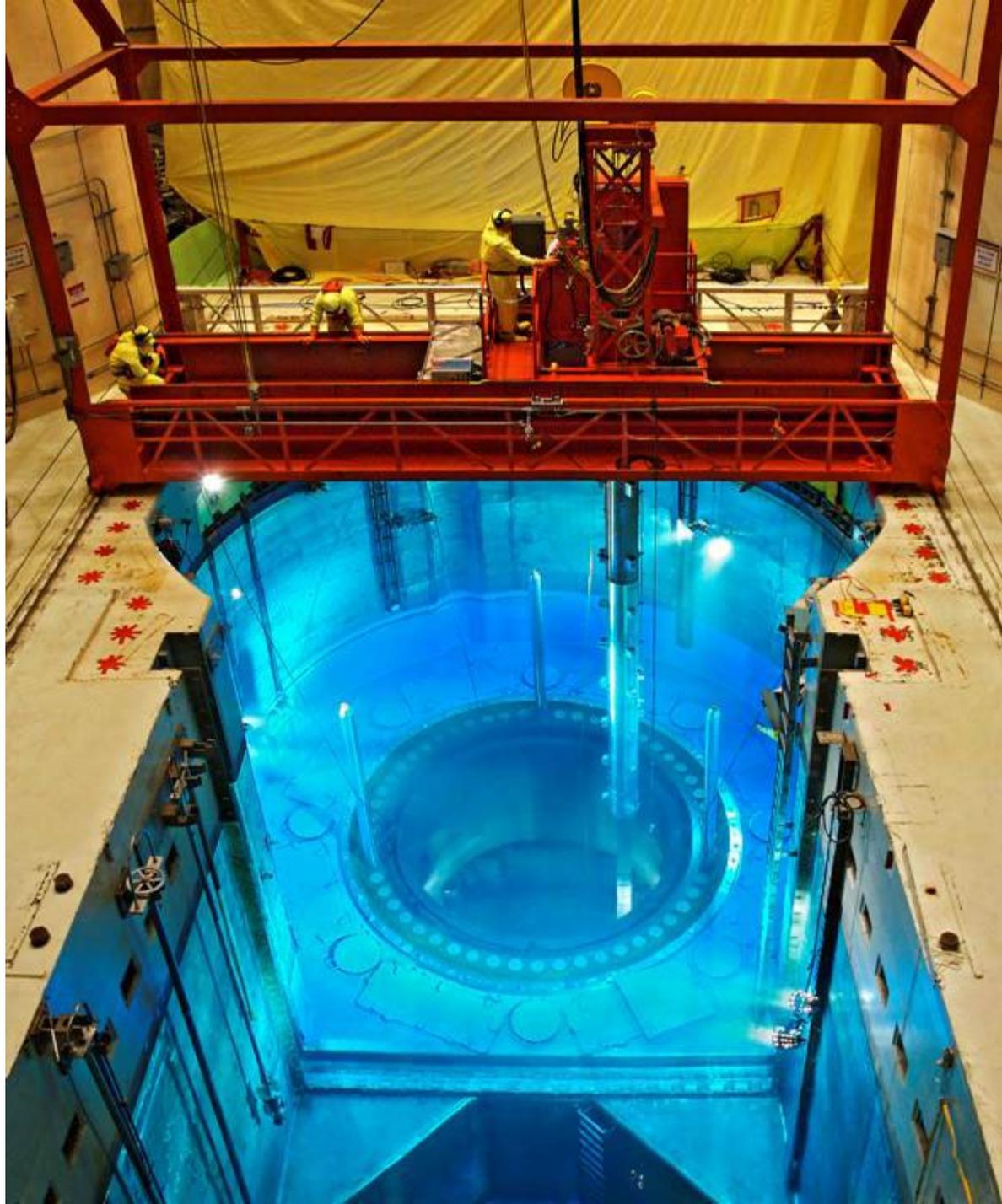
Owner Controlled Area

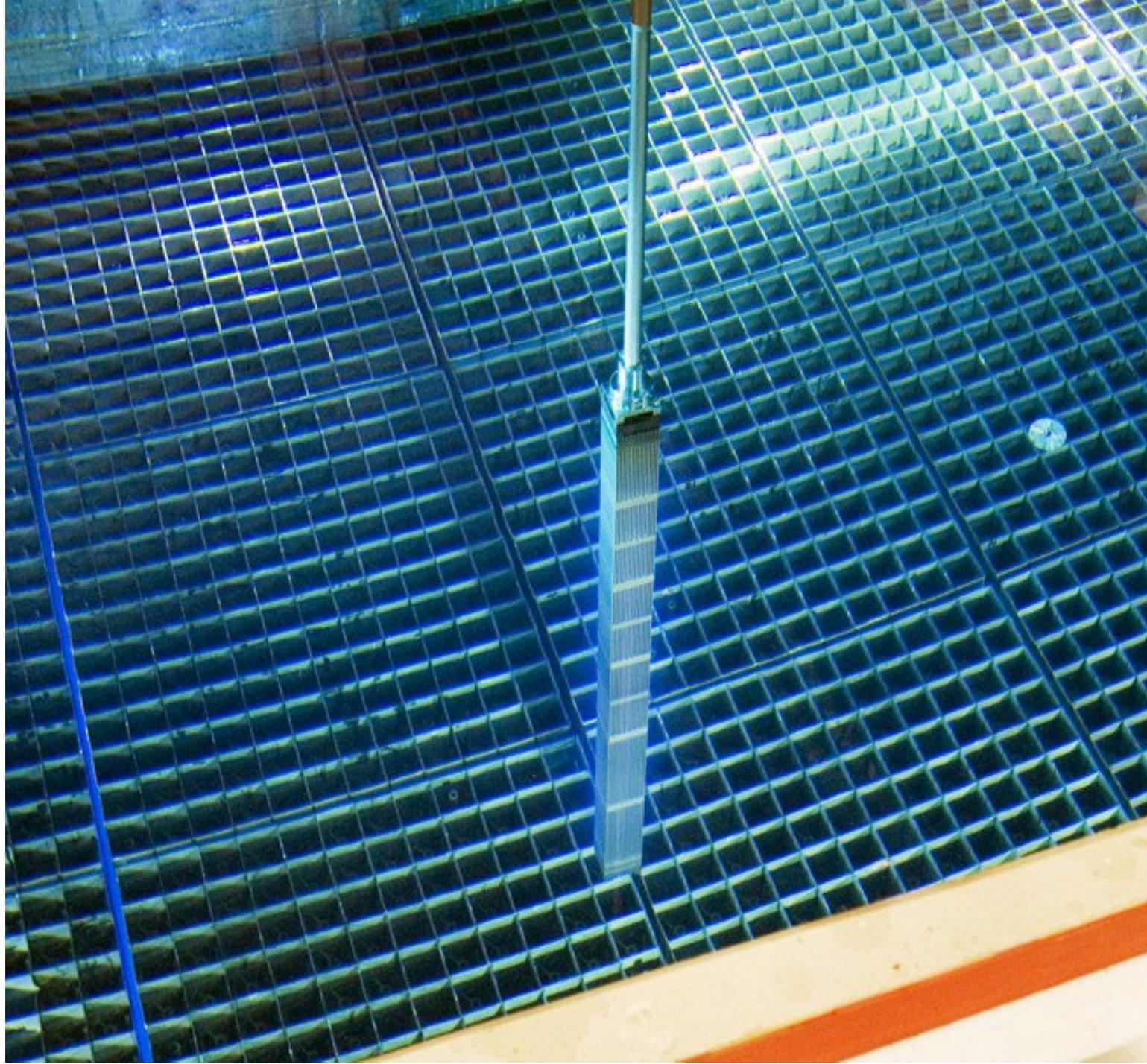
How Cook Generates Electricity



Fuel Rods Filled With Pellets Are Grouped Into Fuel Assemblies

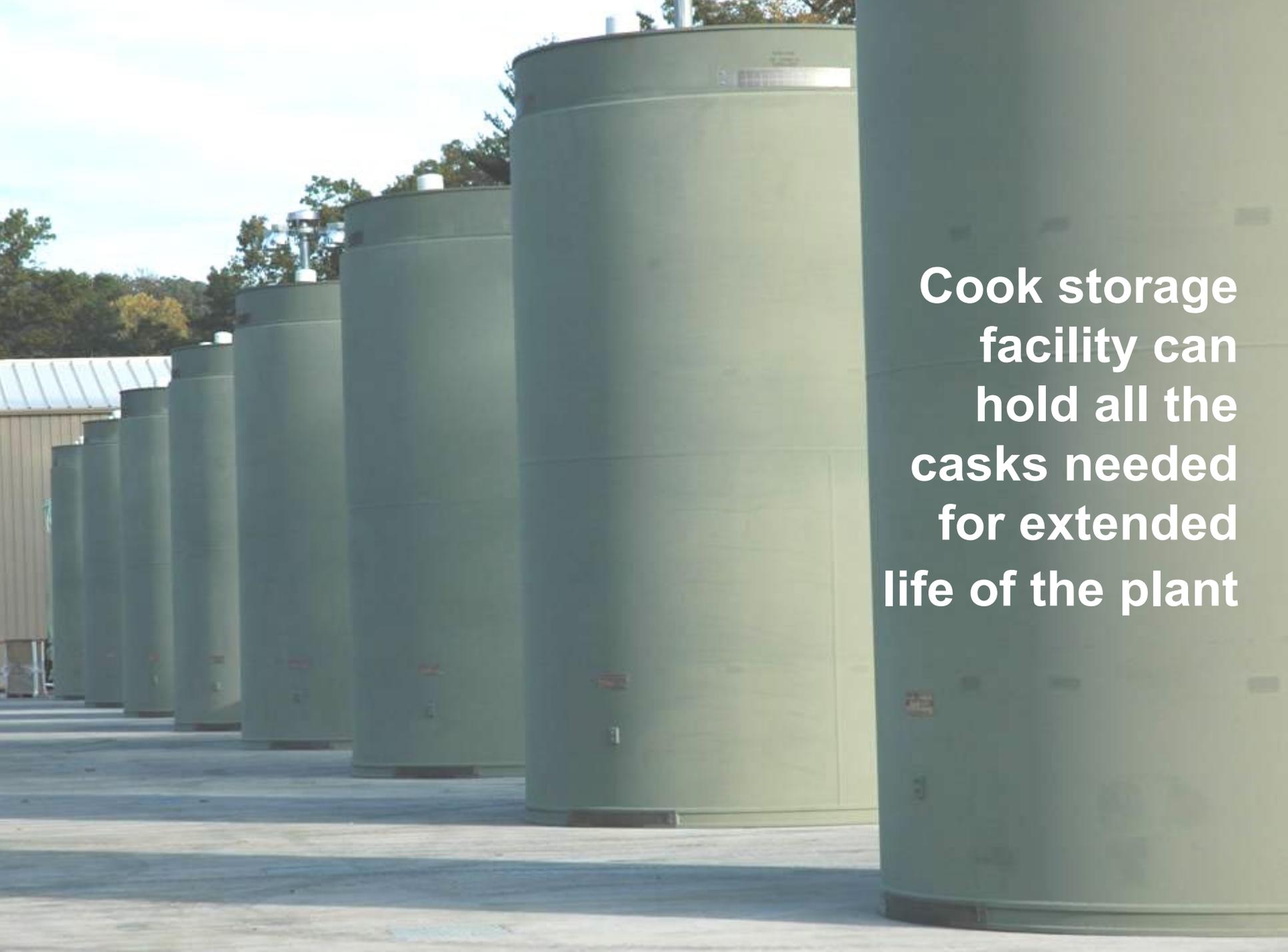








Heavy hauler moves canister and concrete overpack (195 tons) to storage pad



**Cook storage
facility can
hold all the
casks needed
for extended
life of the plant**

N
S

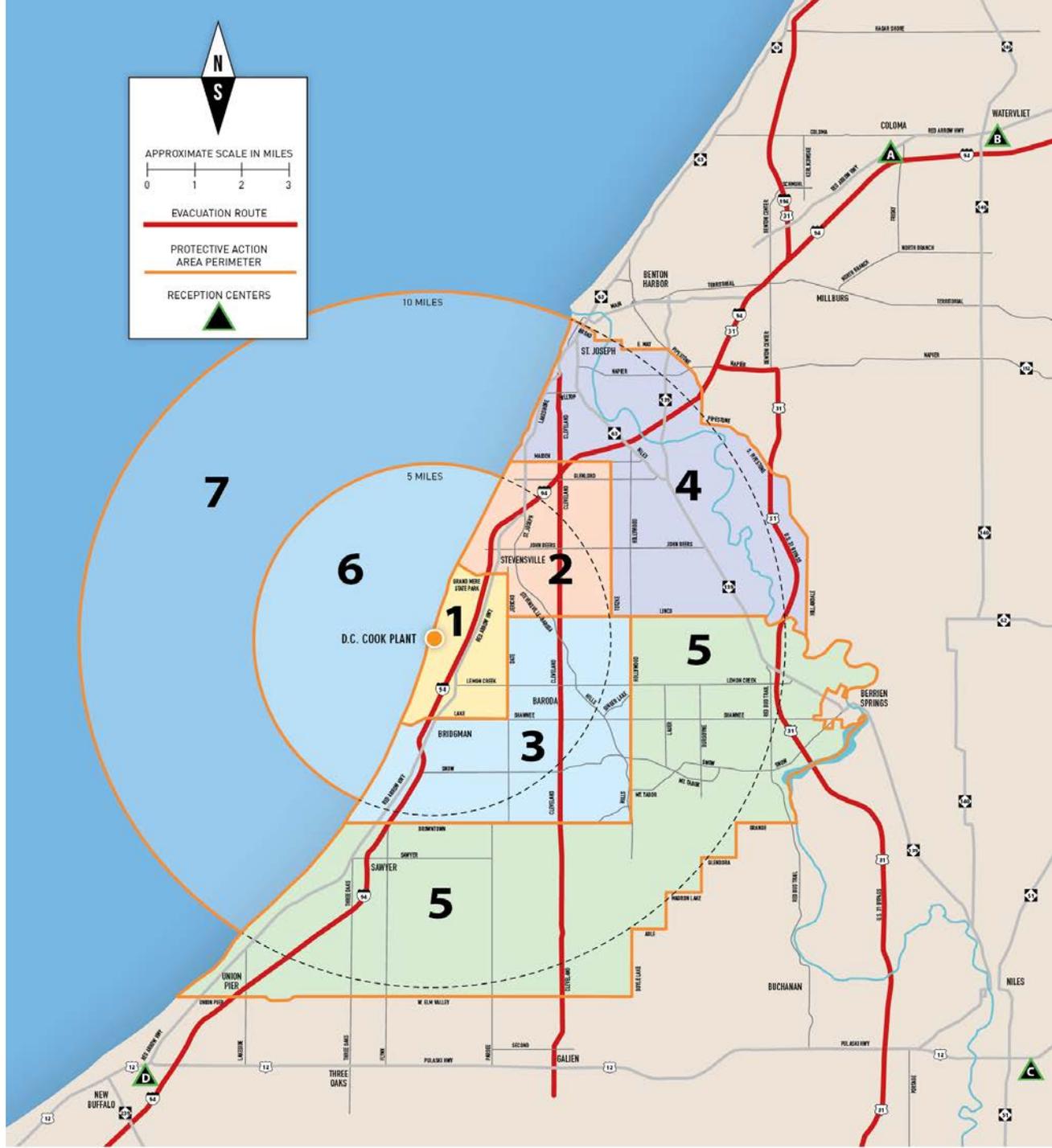
APPROXIMATE SCALE IN MILES

0 1 2 3

EVACUATION ROUTE

PROTECTIVE ACTION AREA PERIMETER

RECEPTION CENTERS



**Attachment E: “U.S. Air Force Modular Nuclear Reactor Discussion”
Technical Conference Presentation
Presented by HDR, Inc., and the City of Altus to the
Oklahoma Corporation Commission
October 21, 2025**

Air Force Modular Reactor Discussion

For Oklahoma Corporation Commission Technical Conference

Mark Correll
Federal Strategy and Air Force Programs Director
HDR, Inc.
October 21, 2025

Army and Air Force Small Modular Reactor (SMR) Focus

- **Army:**
 - **Potential Executive Agent for the Department but still in flux**
 - **Current Focus**
 - **Have been developing mobile SMR under Project “Pele”**
 - **Just announced the Janus Program intended to fast track SMRs for installations in partnership with DOE.**
- **Air Force:**
 - **Office of Energy Assurance**
 - **Fixed Installation-focus Mirco and Small Modular Reactors**
 - **Timing: Likely no earlier than 2028**

Air Force Modular Reactor

- **Focus:**
 - Islandable Energy Resilience
 - Real Estate Transactions for Power/Data Center Development (longer-term)
- **Size:**
 - Micro- Reactor 2-5 MW (Eielson AFB Pilot Awarded)
 - Small Modular Reactor up to 75 MW
 - Not showing interest in 300MW SMR
- **Location:**
 - On or adjacent to installation for AT/FP and Resilience
 - Prioritizing Installations based on mission criticality
- **Method:**
 - Right of Way + 10 USC 2922a Power Purchase Agreement
 - Will not own or operate
 - Utility or Separate Company

License and Permit Actions

- **10 CFR Part 50: Separate Construction Permit and Operating License**
- **10 CFR Part 52: Combined Licensing Process**
 - **Early Site Permit**
 - **Design Certification**
 - **Hearings**
- **SMR Efforts appear focused on Part 52 approach**

**Attachment F: “Occlusion Nuclear Solutions”
Technical Conference Presentation
Presented by Occlusion Solutions to the
Oklahoma Corporation Commission
October 21, 2025**



Occlusion Nuclear Solutions

Underground Precision for Small Modular
Reactor Placement, Monitoring, and
Waste Disposal

OCC Energy Discussion

www.occlusion.solutions

Energy Problem

Global energy demand is rising, but conventional nuclear remains limited by high cost, slow deployment, and complex surface infrastructure.

Energy Demand is outpacing Supply

Traditional nuclear plant requires massive construction, long timelines, and heavy regulation.

Other than nuclear, there are no viable fuel alternatives to hydrocarbons that deliver comparable reliability and cost efficiency.

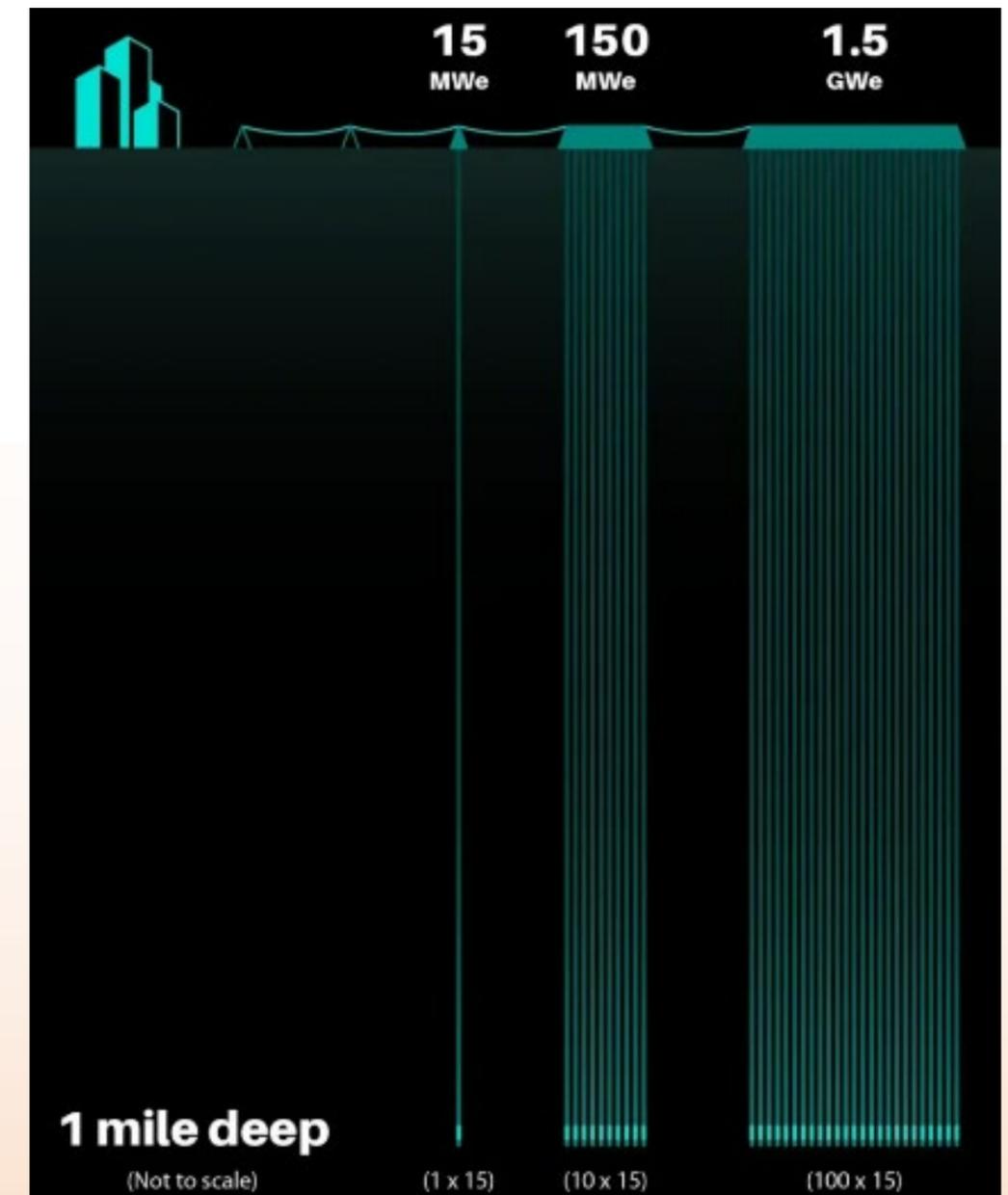
As oil and gas activity shifts toward West Texas, we have an opportunity to keep energy jobs and expertise here in Oklahoma.

Technology	Levelized Cost of Electricity (¢/kWh)
Solar PV + Storage (Utility)	6–21¢
Wind + Storage (Onshore)	4.5–13.3¢
Coal	6.9–16.8¢
Gas Combined Cycle	4.5–10.8¢
US Nuclear (Vogtle)	18.6¢
Advanced / Small Modular Nuclear	N/A
Subsurface SMR	5–7¢

Energy Opportunity

Oklahoma has decades of oil & gas expertise — drilling, completions, and subsurface operations that directly align with subsurface nuclear power generation model.

- **Job Retention & Transition** : Apply oilfield skills to borehole reactor drilling and operations.
- **Manufacturing & Supply Chain:** Use local fabrication and service yards for modular builds.
- **Energy Leadership:** Position Oklahoma as a pilot state for subsurface nuclear technology
- **Grid & Industry Support:** Provide stable baseload power as Oklahoma's industrial and data center demand accelerates.
- **Economic Stability:** Sustain energy revenues as hydrocarbon production diversifies.



Nuclear Waste Problem

Spent nuclear fuel stockpiling with no permanent solution.

Global Waste Burden: Over 270,000 metric tons of high-level waste exist worldwide, growing by about 7,000 tons per year, with no scalable long-term solution in place.

U.S. Storage Challenge: More than 90,000 metric tons are stored at 70+ sites across the U.S., mostly in temporary pools or dry casks not designed for centuries of containment.

Mounting Risk & Cost: Temporary storage creates ongoing security, environmental, and political liabilities, already costing U.S. taxpayers billions annually.

Need for Permanent Solutions: With no U.S. repository operational and only Finland's Onkalo nearing completion, deep borehole disposal remains the most practical path to safe, permanent isolation.



Partnership with Deep Isolation

Occlusion Nuclear Solutions partners with Deep Isolation to deliver safe, permanent nuclear waste disposal.

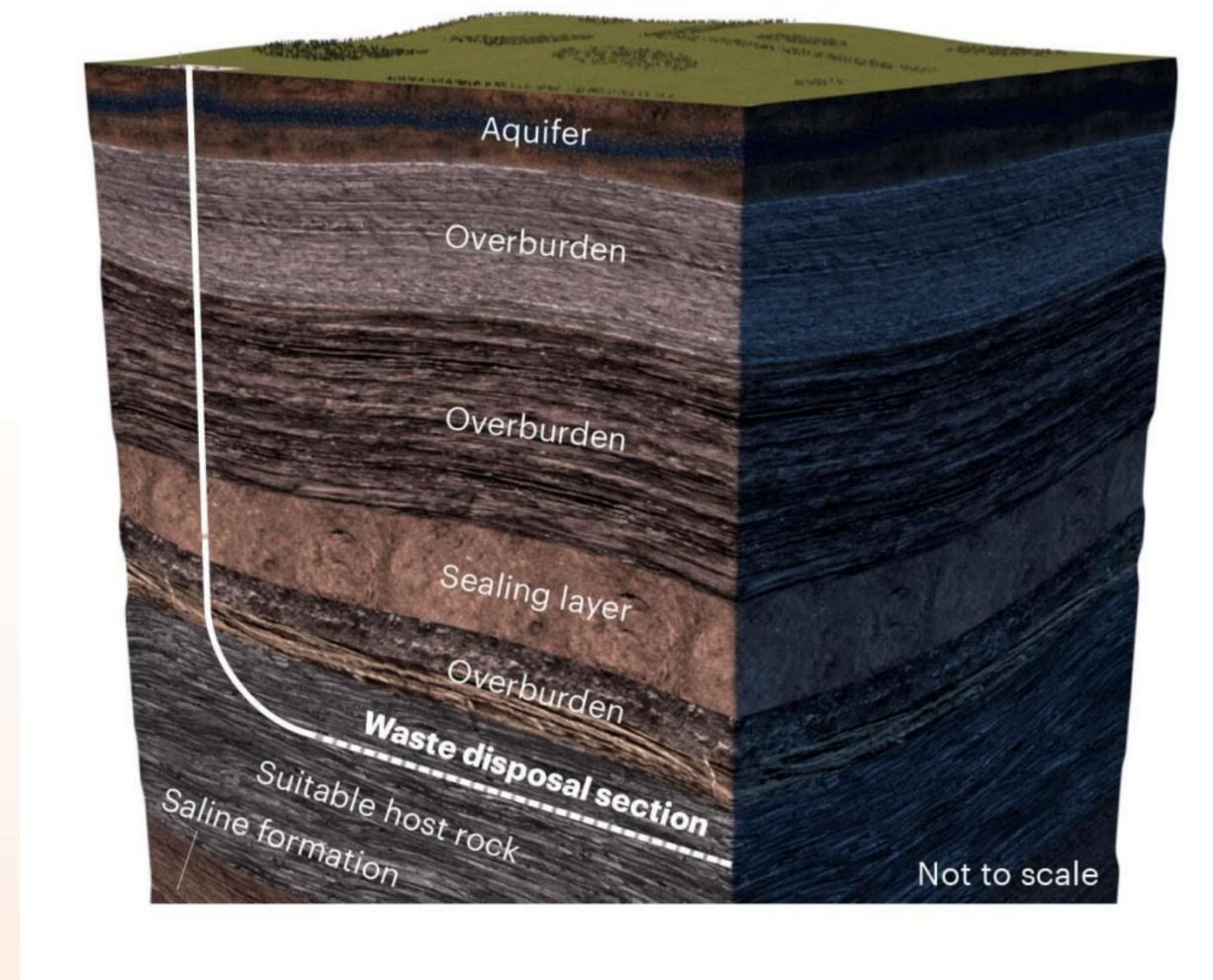
We Provide:

Borehole engineering

Canister placement

Retrieval

Real-time monitoring



Combining oil & gas expertise with advanced subsurface technologies to ensure secure, long term waste isolation.



Contact

Wink Kopczynski
CEO

Phone
918-284-5322

Email
wink@occlusion.solutions

PITCH DECK

www.occlusion.solutions

**Attachment G: “Perspectives on Nuclear Challenges in Oklahoma”
Technical Conference Presentation
Presented by Western Farmers Electric Cooperative to the
Oklahoma Corporation Commission
October 21, 2025**



Western Farmers Electric Cooperative Perspective on Nuclear Challenges in Oklahoma

Presented by Justin Soderberg

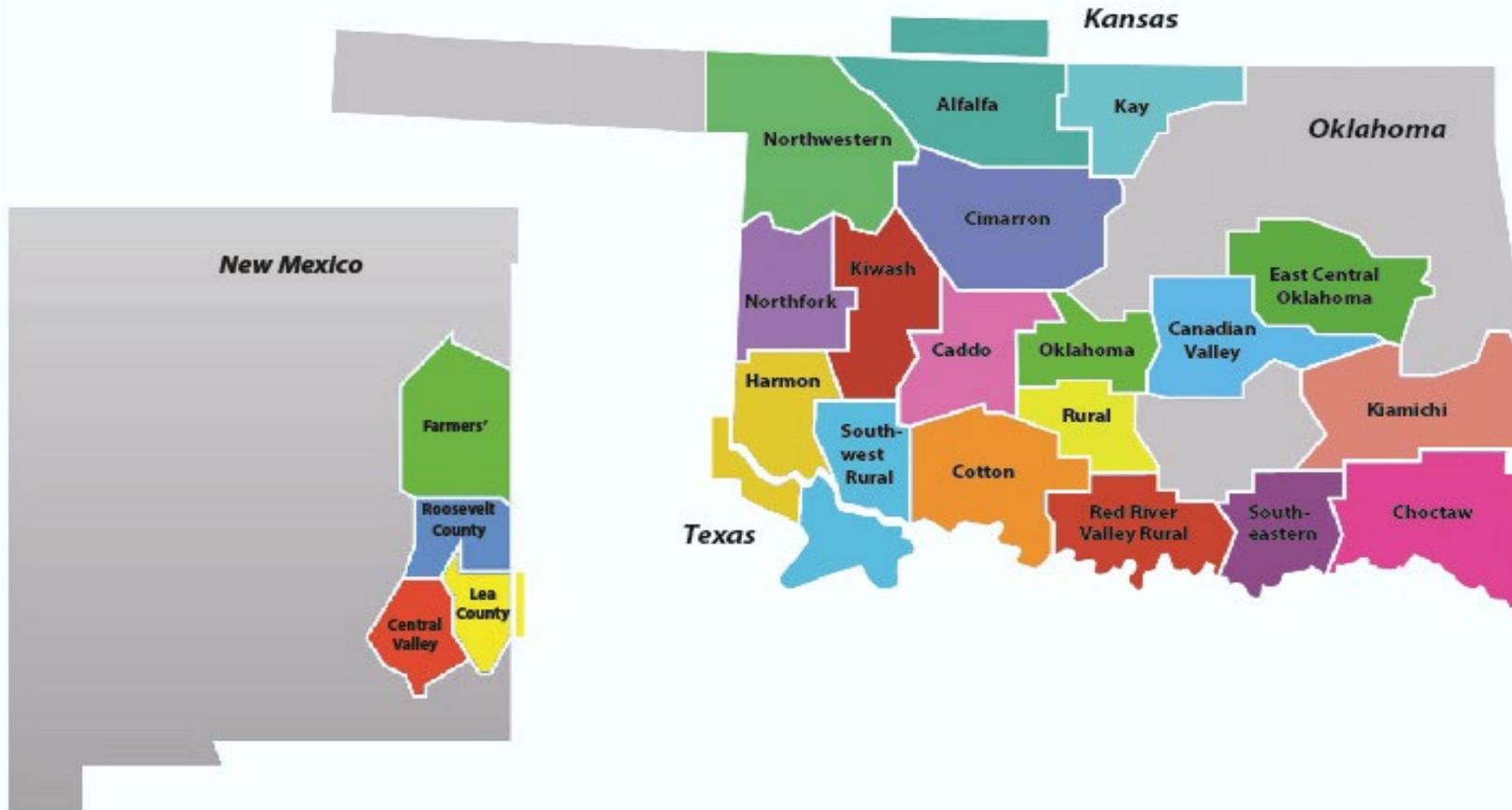
Vice President, Generation

Western Farmers Electric Cooperative

Western Farmers Electric Cooperative (WFEC)

- WFEC is a not-for-profit, member owned cooperative
- Established in 1941, WFEC is the longest-operating rural generating and transmission (G&T) cooperative in Oklahoma
- WFEC is owned by twenty-one (21) member electric distribution cooperatives
- WFEC generates and transmits electricity to more than 2/3 of the geographical area of Oklahoma
- WFEC is governed by a Board of Trustees, each representing a member cooperative
- Members are entitled to elect trustees, set rates, democratically control capital, and receive capital credits

WFEC Service Territory



Challenges for Nuclear in Oklahoma

- No Nuclear Base
- Education
- High Capital Costs
- Fit in the Southwest Power Pool Energy Market
- Public Resistance

No Nuclear Base

- Currently no nuclear facilities are located within Oklahoma
- Never had a nuclear reactor in Oklahoma
- Oklahoma has limited or no nuclear expertise
- High schools, vocational schools, and universities do not offer nuclear programs
- Nuclear plants need trained radiological employees and security personnel which is unique to nuclear facilities

Education

- Many of the nuclear knowledge that existed in the 1970's and 1980's has aged out of the workforce
- Colleges and universities offer nuclear engineering and nuclear related fields primarily in states that already have a nuclear base (reactors, enrichment, defense, etc.)
- Closest nuclear engineering degree programs
 - Kansas State University – B.S. in Nuclear and Mechanical Engineering
 - Missouri University of Science and Technology – B.S. in Nuclear Engineering
 - Texas A&M University – B.S. in Nuclear Engineering

Education

- Encourage and incentivize Oklahoma high schools, vocational schools, and universities to offer programs for;
 - **Nuclear engineers** - Designs, develops, and tests nuclear reactors, equipment, and safety systems
 - **Nuclear reactor operators** - Monitors and controls the nuclear reactor to ensure safe and efficient energy production
 - **Radiation protection technicians** - Monitors radiation levels and ensures the safety of personnel
 - **Health physicists** - Specializes in the protection of people and the environment from radiation
 - **Data scientists** - Analyzes large datasets to improve efficiency and safety

High Capital Cost

- Last nuclear reactors constructed in the United States
- Vogtle Units 3 & 4

		Megawatts (MW)	Cost (\$)	Completion (year)	\$/kw
Vogtle 3 & 4	Proposed	2,200	\$14,000,000,000	2016	\$6,363
	Actual	2,200	\$35,000,000,000	2023	\$15,909

High Capital Cost

- Canceled Small Modular Reactor (SMR) project

		Megawatts (MW)	Cost (\$)	Estimated Cost Year	\$/kw
Nuscale (UAMPS)	Proposed	720	\$3,600,000,000	2018	\$5,000
	Canceled	720	\$9,300,000,000	2023	\$12,916

High Capital Cost

- Projected Small Modular Reactor (SMR) projects

		Megawatts (MW)	Cost (\$)	\$/kw
Ontario Power	GE Vernova/Hitachi BWRX-300	1200	\$21,000,000,000	\$17,500
Tennessee Valley Authority(TVA)	GE Vernova/Hitachi BWRX-300	300	\$5,400,000,000	\$18,000
TerraPower	Molten Chloride Fast Reactor	500	\$4,000,000,000	\$8,000

High Capital Cost

- Projected fossil generation projects

	Megawatts (MW)	Cost (\$)	\$/kw
Natural Gas	100	\$219,000,000	\$2,190
Natural Gas	400	\$860,000,000	\$2,150

High Capital Cost

- Fossil generation capital cost is much more economical
- Need tremendous amount of state and federal subsidies to mitigate the impact to consumer utility rates
- Cost certainty is an issue as nuclear projects have routinely exceeded their budgets

Market Fit

- Southwest Power Pool (SPP) footprint and especially Oklahoma is blessed or cursed with abundance of wind
- Wind is highly variable
- Nuclear reactors have high capital costs that require base load operation for Return on Investment (ROI) (could backfire in market-based system)
- Nuclear reactors do not have the capabilities to fluctuate load quickly due to thermal inertia of the steam generators

Public Resistance

- Three Mile Island
- Chernobyl
- Fukushima
- Environmental issues (waste disposal)
- Nuclear materials in the wrong hands for weaponry

Thoughts on moving forward

- Watch the first one be built (maybe first 10 be built)
- Watch how the technology evolves
- Start educating our youth in high schools about the opportunities of nuclear jobs
- Put the facilities in place to train our youth
- Educate the communities on the benefits of nuclear energy and the need for nuclear energy

**Attachment H: “Nuclear Options in Resource Planning”
Technical Conference Presentation
Presented by Oklahoma Gas and Electric Company to the
Oklahoma Corporation Commission
October 21, 2025**



We Energize Life

A horizontal line of small, colored dots in red, orange, yellow, and blue, positioned below the tagline.

Nuclear Options in Resource Planning

Technical Conference in OCC Notice of Inquiry for Nuclear Generation (GD 2025-000004)
Kelly Riley, OG&E Director Resource Planning

October 21, 2025

A series of overlapping, wavy lines in white, yellow, orange, and red, spanning the width of the slide and positioned above the date.

Agenda

- **Introduction**
 - Southwest Power Pool
- **Current Oklahoma Resource Planning Process**
 - Integrated Resource Plans
 - Competitive Procurement
- **Nuclear – Looking Ahead**

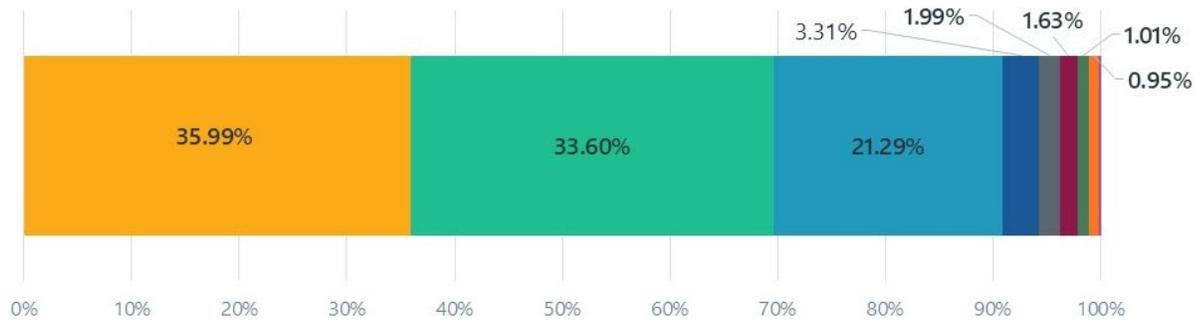


Introduction

Southwest Power Pool

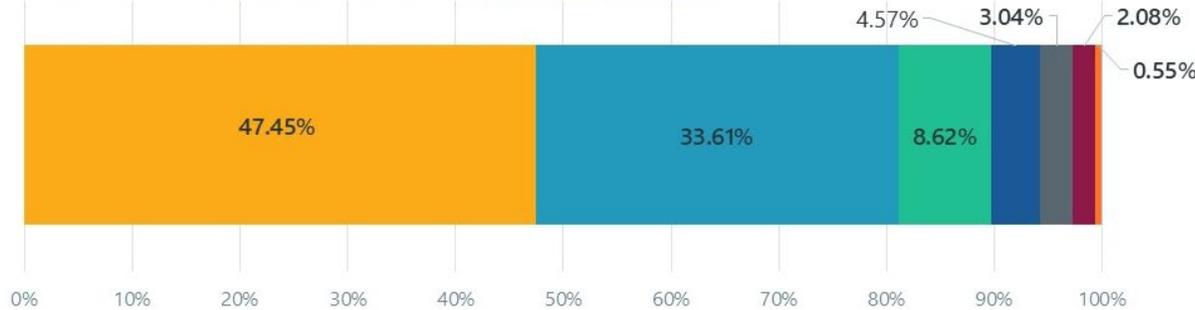
NAMEPLATE GENERATING CAPACITY – 103,614 MW *(As of January 2025)*

- Natural Gas - 37,291 MW
- Wind - 34,814 MW
- Coal - 22,065 MW
- Hydro - 3,428 MW
- Nuclear - 2,061 MW
- Fuel Oil - 1,688 MW
- Demand Response - 1,051 MW
- Solar - 986 MW
- Storage - 141 MW
- Other - 75 MW
- MSW - 16 MW

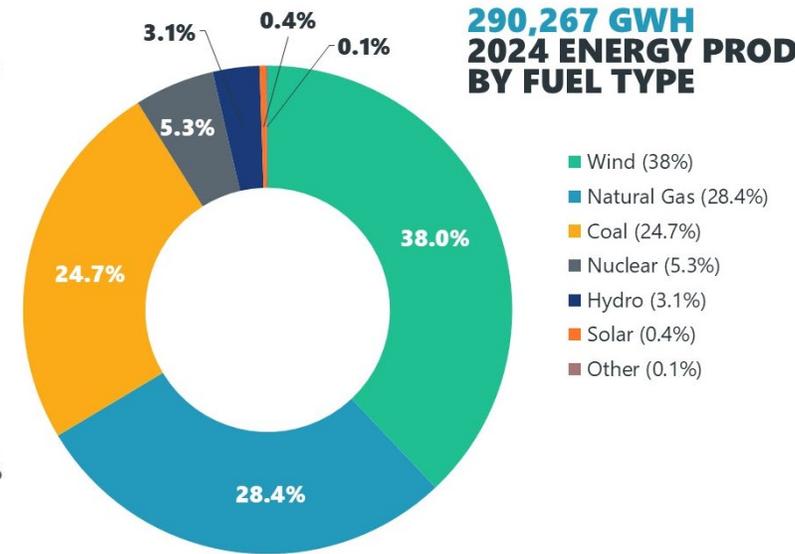


ACCREDITED GENERATING CAPACITY – 63,908 MW *(As of Summer 2024)*

- Natural Gas - 30,325 MW
- Coal - 21,481 MW
- Wind - 5,511 MW
- Hydro - 2,920 MW
- Nuclear - 1,945 MW
- Fuel Oil - 1,328 MW
- Solar - 350 MW
- Other - 30 MW
- MSW - 16 MW



290,267 GWH 2024 ENERGY PRODUCTION BY FUEL TYPE



[SPP 2024 Annual State of the Market Report](#)



Oklahoma Resource Planning Process

Resource Planning Purpose

Ensure Adequate Resources to serve the Needs

SPP
Requirements

Load

Reliability

Environmental

Resource Planning Process

Integrated Resource Plans

- Resource Needs
- Triennial

RFP

- Resources
- Timelines

Regulatory Approval



Nuclear – Looking Ahead

Nuclear – Looking Ahead

Opportunities

Risks

Technology

Reliability

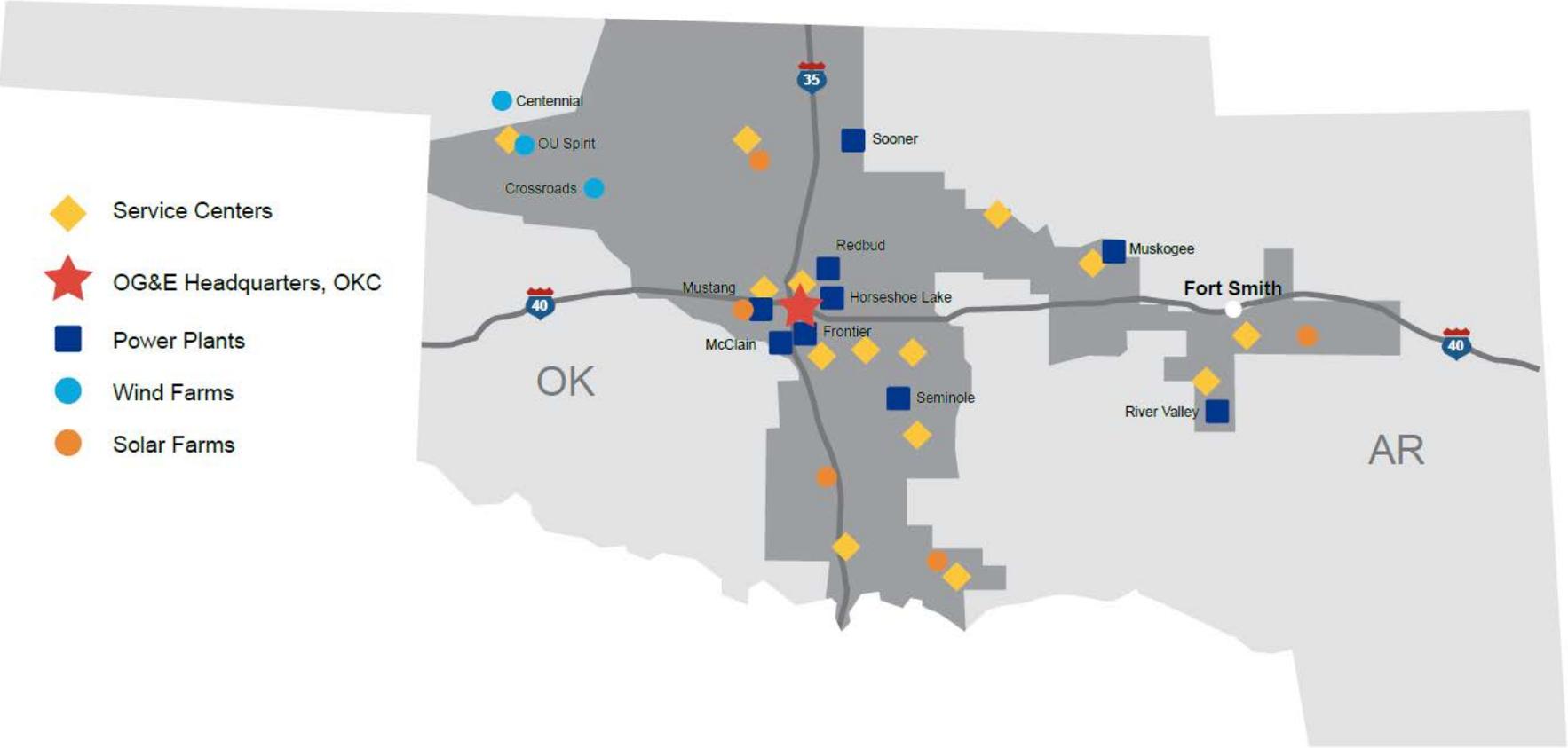
Costs

Partnership Options



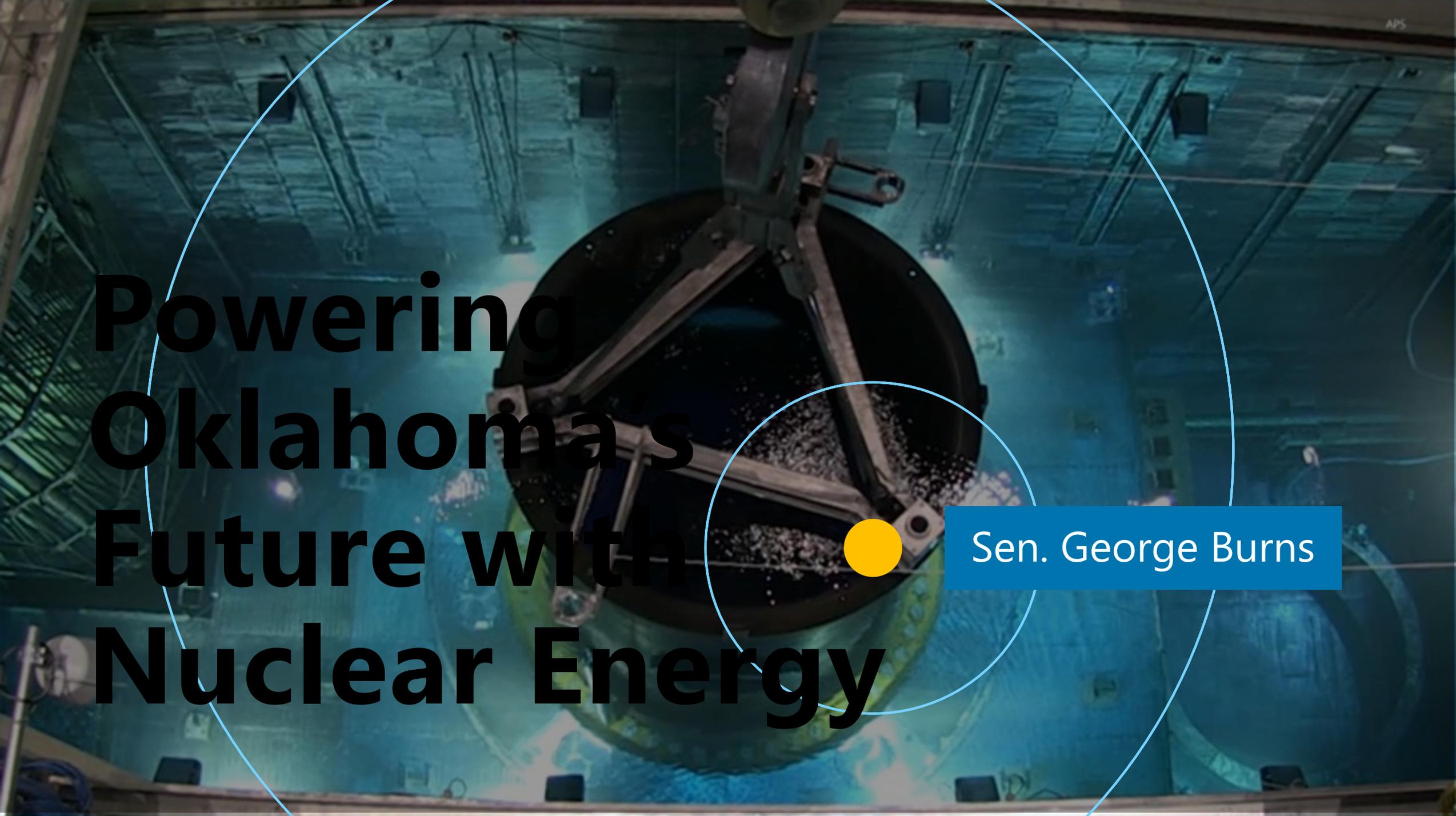
Appendix

OG&E's Existing Generation Fleet



Type	Summer Capacity (MW)
Natural Gas	4,560
Coal	1,880
Wind	81
Renewable PPAs	62
Solar	24
Total	6,608

**Attachment I: “SSP1011 Nuclear Power Plant Capability
Study Synopsis”
Presented to the Oklahoma Senate Energy and
Telecommunications Committee
October 31, 2023**



Powering Oklahoma's Future with Nuclear Energy

Sen. George Burns



Imagine a future where clean, reliable, and sustainable electricity powers our homes, businesses, and industries, all while reducing our carbon footprint.

Welcome to the world of nuclear power, a game-changer that can transform Oklahoma's energy sector - bringing nuclear power to Oklahoma is a smart choice for our state's future.

Why Nuclear Power?

1

Clean and Sustainable Energy

2

Grid Reliability

3

Energy Security and Diversity

4

Addressing Future Energy Needs for Oklahomans

5-7

Low Environment Impact

Job Creation for Oklahomans

Cutting Edge Technology

Are you ready to take
Oklahoma's energy landscape to
the next level?

Clean and Sustainable Energy

Nuclear power offers a clean and sustainable energy solution. By introducing nuclear energy to Oklahoma, we can significantly reduce our reliance on fossil fuels, cutting greenhouse gas emissions and contributing to a cleaner environment.

Grid Reliability

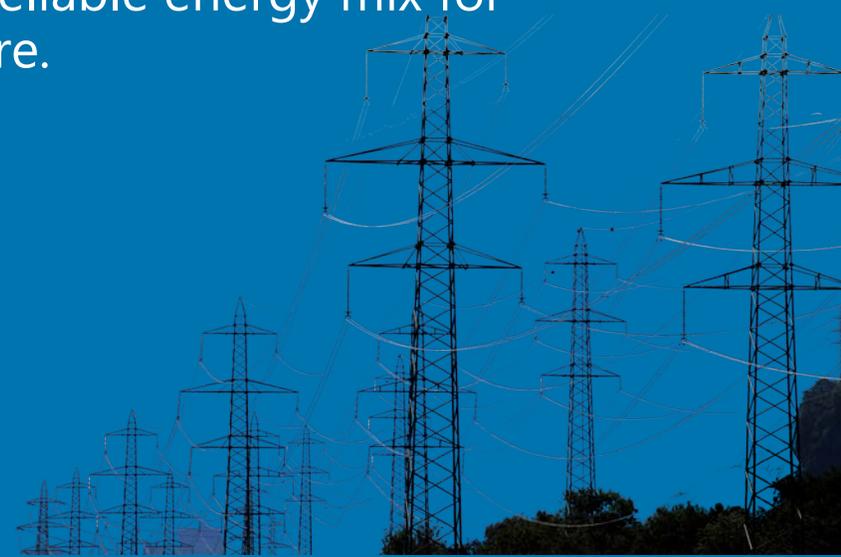
Nuclear power contributes to grid reliability. It provides a consistent source of baseload electricity, reducing the risk of blackouts and brownouts. Oklahoma can enjoy a reliable power supply, even during peak demand periods.

Energy Security

Nuclear power plants provide a stable, continuous source of electricity, enhancing energy security in Oklahoma. With nuclear power, we can reduce vulnerability to energy supply disruptions and price fluctuations, ensuring that power is always available when we need it.

Energy Diversity

A diversified energy portfolio is key to resilience. Nuclear power complements other renewable energy sources, such as wind and solar, ensuring a balanced and reliable energy mix for Oklahoma's future.



Job Creation

The nuclear industry is a catalyst for economic growth. By bringing nuclear power to Oklahoma, we can create a multitude of jobs, from construction and operations to research and development. These jobs will support local communities and stimulate the state's economy.

Cutting-Edge Technology

Embracing nuclear power means embracing cutting-edge technology. Modern nuclear reactors are designed with advanced safety features, including passive cooling systems, ensuring that the highest safety standards are met.



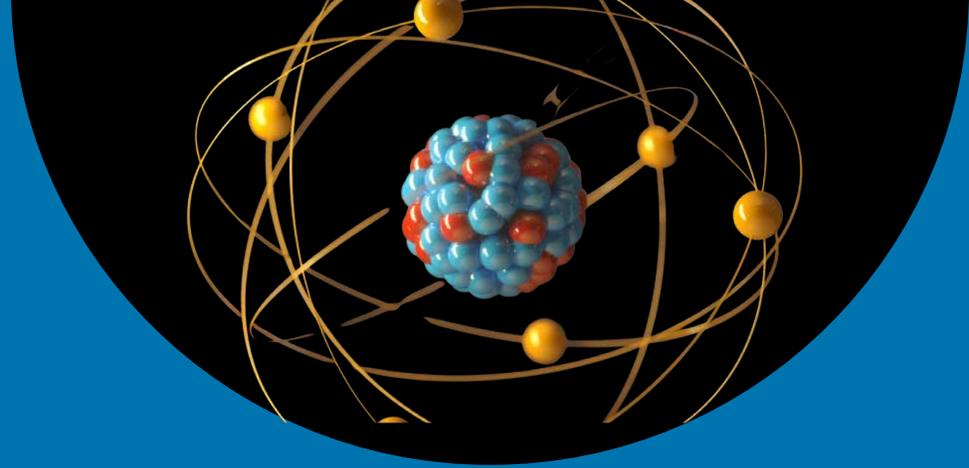
Let's join the Energy Revolution!

Low Environmental Impact

Nuclear power plants produce minimal air pollutants, making them an environmentally friendly choice. Compared to the emissions from the oil and gas industry, nuclear power is a breath of fresh air for Oklahoma's environment.

Addressing Future Energy Needs

Oklahoma's energy demand is growing, and nuclear power can help meet these needs sustainably. By investing in nuclear energy today, we ensure a prosperous and energy-secure future for generations to come.



Leading the Future

Oklahoma has the opportunity to lead the way in clean energy innovation by embracing nuclear power. It's a chance to reduce emissions, create jobs, and ensure a reliable energy supply for all.



A

C

T

Nuclear power is known for its high energy density, which means a small amount of nuclear fuel can produce a substantial amount of electricity over an extended period.

This characteristic, along with its relatively low carbon emissions, has made nuclear power a significant contributor to electricity generation in many countries around the world.

However, it also comes with challenges related to safety, waste disposal, and public perception.

What is Nuclear Power?

Nuclear Fuel

Nuclear fuel is primarily composed of fissile materials, such as uranium-235 (U-235) or plutonium-239 (Pu-239). These materials are carefully chosen for their ability to undergo nuclear fission, releasing immense amounts of heat energy.

Converted to Power Source

Nuclear fuel is placed within a nuclear reactor. Here, controlled nuclear fission reactions occur, producing a tremendous amount of heat. This heat is then used to generate steam from water, which powers turbines connected to generators. The result? Clean and reliable electricity for Oklahoma.





Reactor Types

While there are several types of nuclear reactors the primary focus of this Interim Study is on

Small Modular Reactors (SMRs)

SMRs represent the next generation of nuclear technology. They are smaller, modular, and highly versatile. SMRs can be manufactured in factories and then transported to their operational site. This means reduced construction time and costs. The versatility of SMRs mean less prep time, more options, greater flexibility and are great attractants to new business opportunities.

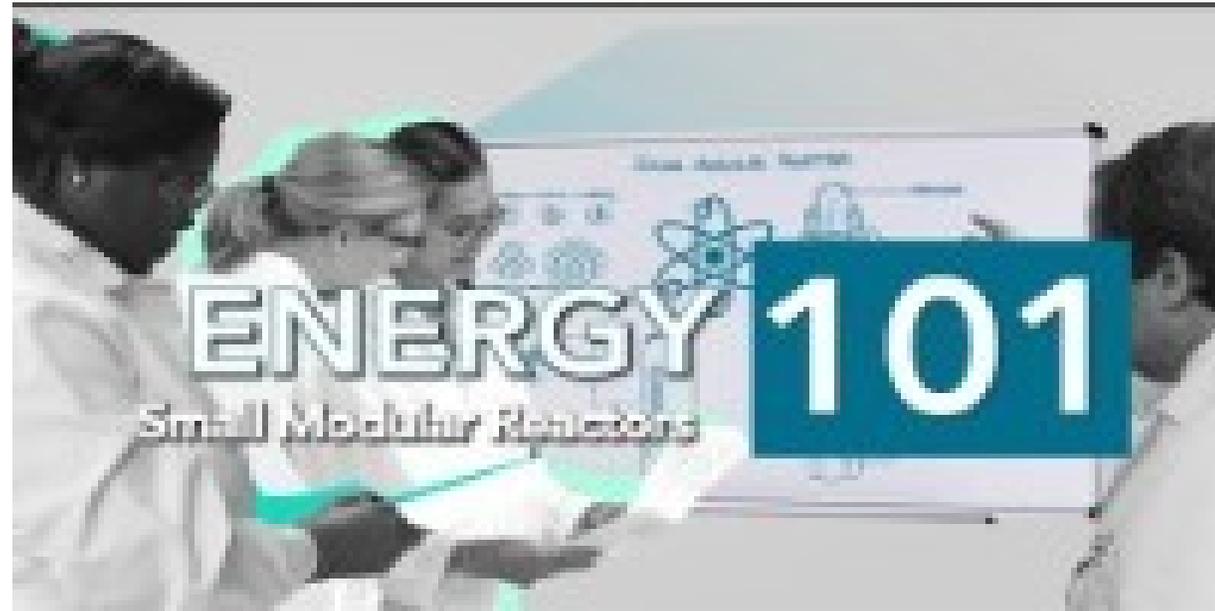
According to the US Department of Energy one study "estimated deployment of a 100 megawatt SMR could create 7,000 jobs and generate more than \$1 billion in sales."

DOE cite: <https://www.energy.gov/ne/articles/4-key-benefits-advanced-small-modular-reactors>

Study cite:

[www.uxc.com/smr/Library%5CImpact on National Economy/2010 – Paper on the Economic and Employment Impacts of SMRs.pdf](http://www.uxc.com/smr/Library%5CImpact%20on%20National%20Economy/2010%20-%20Paper%20on%20the%20Economic%20and%20Employment%20Impacts%20of%20SMRs.pdf)

Energy 101: Small Modular Reactors



HOW DO SMRS WORK?

1

Nuclear power plants generate heat through nuclear fission. The process begins in the reactor core. Atoms are split apart – releasing energy and producing heat as they separate into smaller atoms. The process repeats again and again through a fully controlled chain reaction.

2

Control rods made of neutron-absorbing material are inserted into the core to regulate the amount of heat generated by the chain reaction.

3

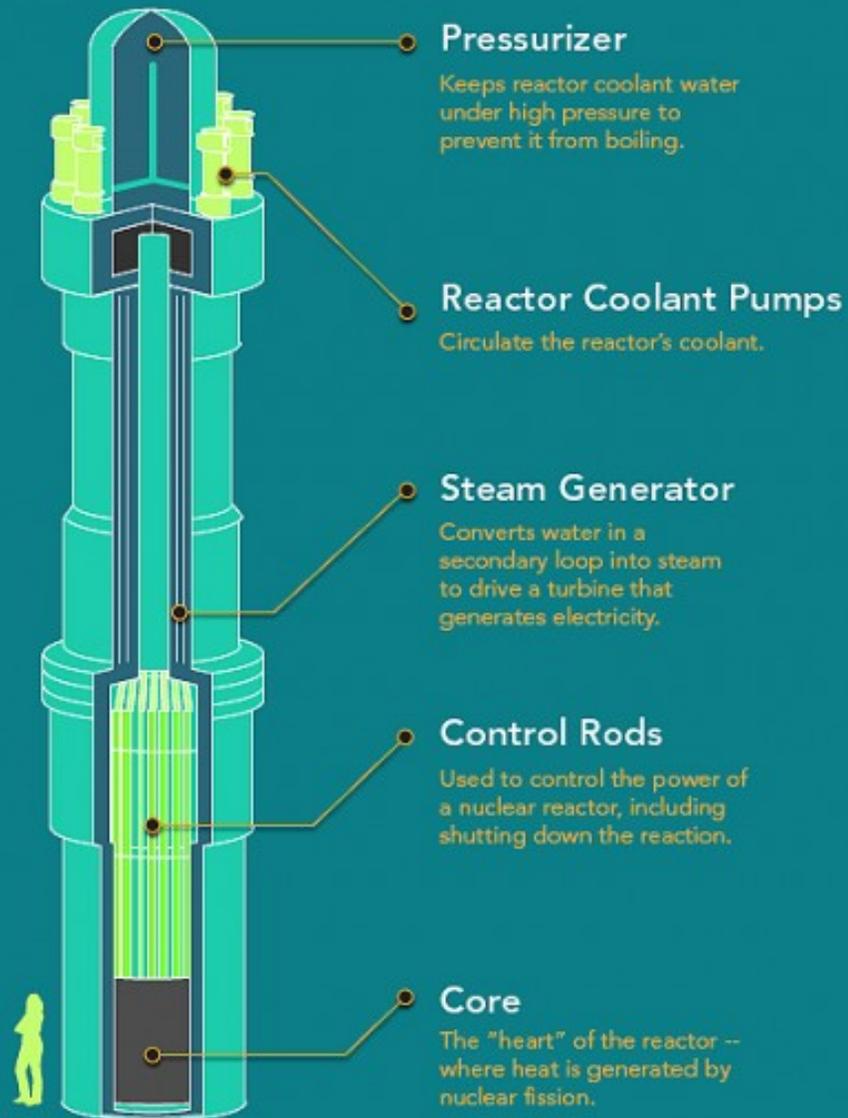
Reactor coolant water picks up heat from the reactor core. Reactor coolant pumps circulate this hot water through a steam generator, which converts water in a secondary loop into steam.

4

The steam is used to drive a turbine, which generates electricity.

5

Throughout the process, the pressurizer keeps the reactor coolant water under high pressure to prevent it from boiling.



Safety Advantages

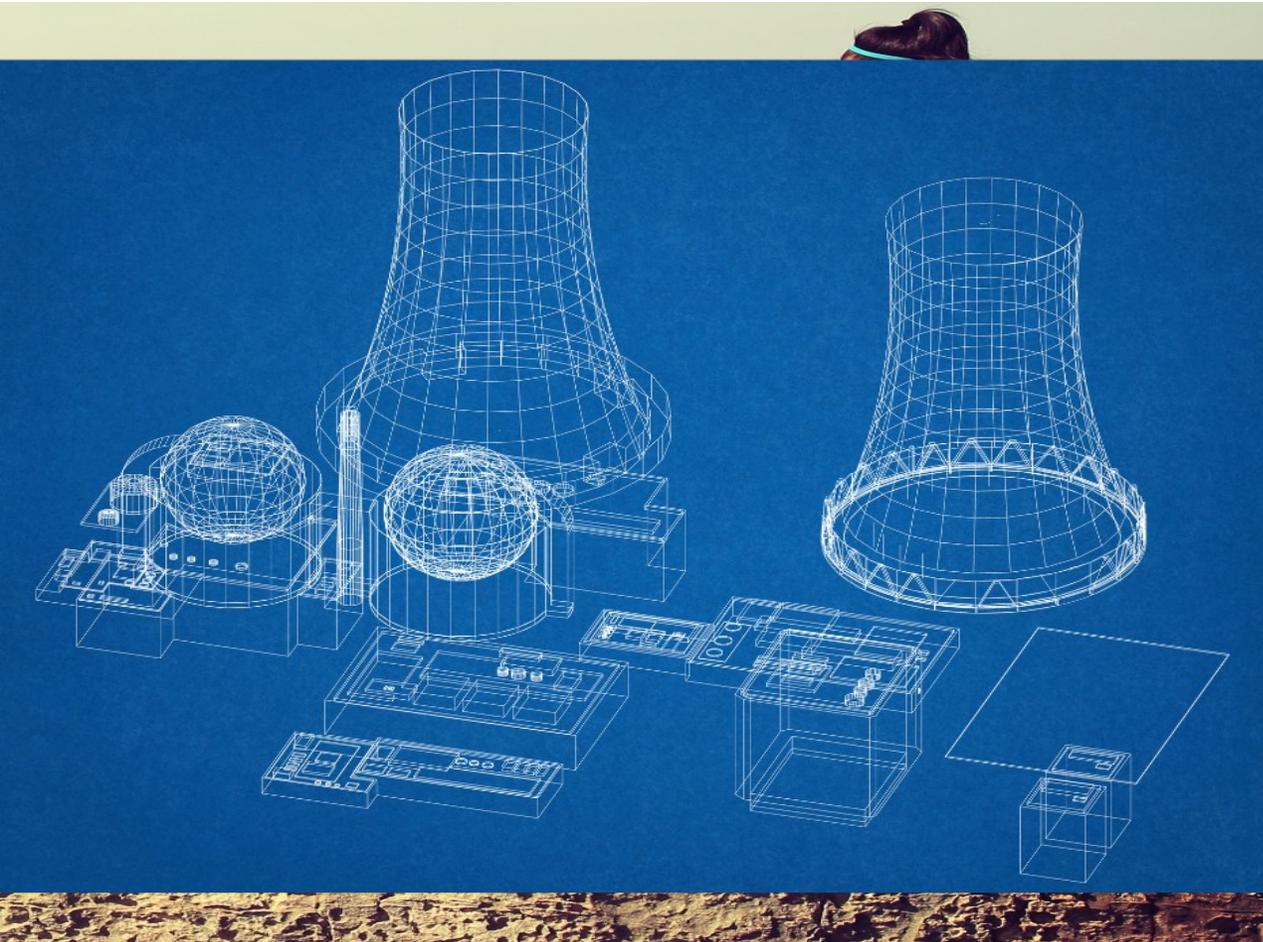
SMRs are smaller in size and designed with passive safety features. In the event of a malfunction, they are designed to shut down automatically, minimizing the risk of a catastrophic event. Additionally, they produce less radioactive waste and can use alternative coolants, reducing the risk of coolant-related accidents.

Reliability

A nuclear power plant can provide a stable and consistent source of electricity, contributing to grid reliability and reducing dependence on fossil fuels. While Nuclear Power can impact the oil and gas industry, both industries can coexist and even benefit from diversification.

Jobs

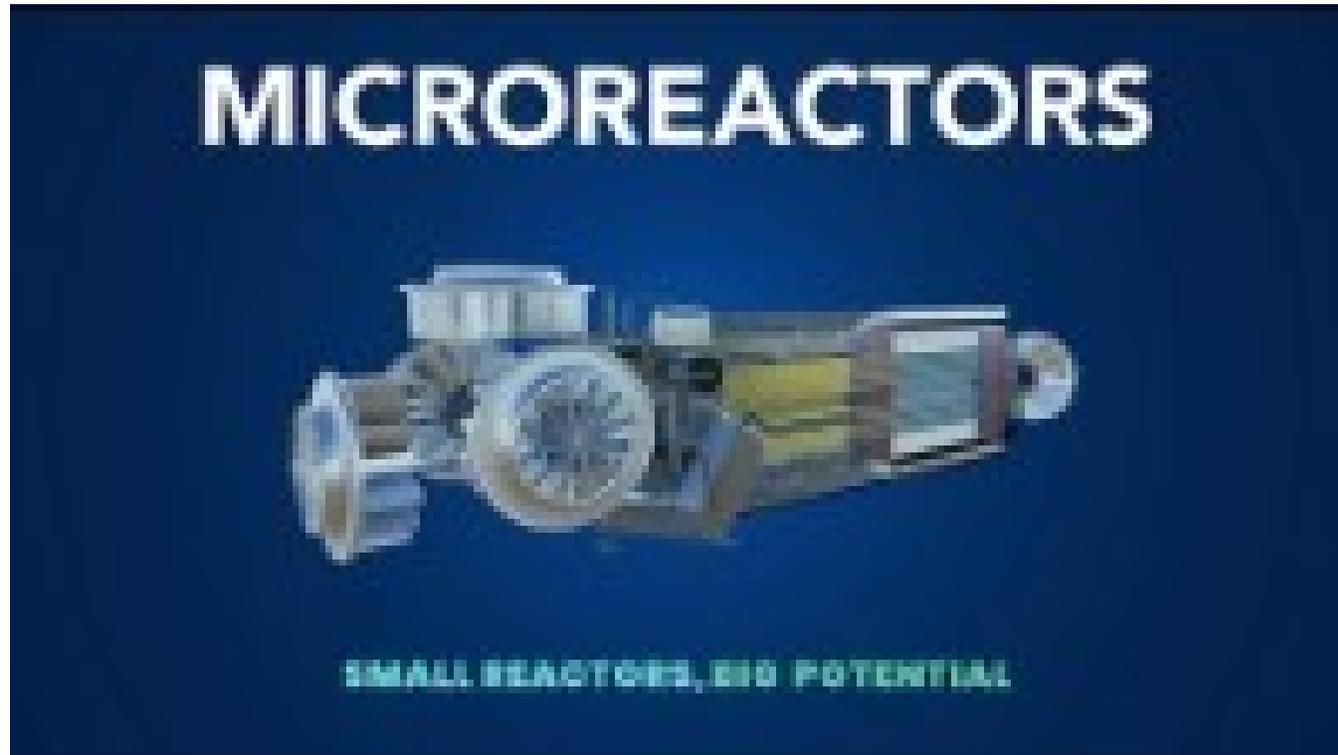
Nuclear power plants create jobs in construction, operation, maintenance, and support services, contributing to local employment and economic growth.



Wait ... there is more

Micro Reactors

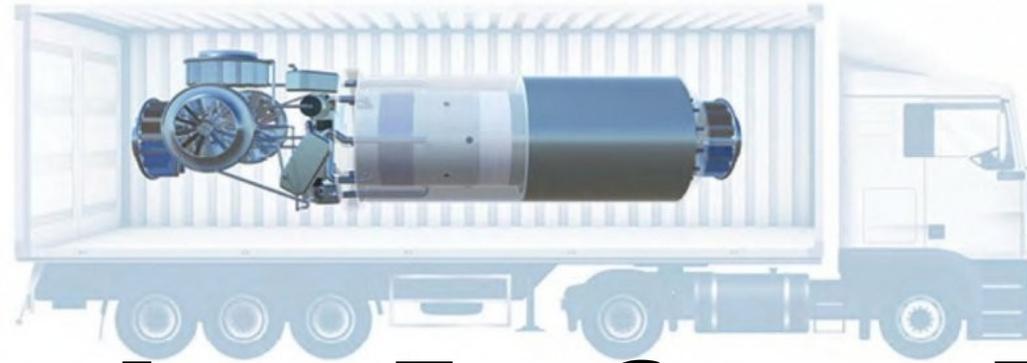
What are they and how are they different?





Micro Reactors ability to be rapidly deployed and customized for various applications makes these reactors a valuable addition to the nuclear energy landscape, providing access to clean and sustainable energy where it was previously challenging or impossible to achieve.

Advantages of Micro Reactors Recap



1 & 2

Portability
&
Rapid
Deployment

3 & 4

Reduced
Infrastructure
&
Customization

5 & 6

Enhanced Safety
&
Low Environment
Impact

7

Energy Access
*in remote and
underserved
communities*

8

Modular Design
Potential cost savings

The background is a photograph of the interior of a space station, showing a large circular hatch and various mechanical components. A large, light blue circle is overlaid on the image. A smaller, light blue circle is centered on a yellow dot, which is positioned on the hatch. A blue rectangular box is located to the right of the yellow dot, containing the text "Thank you!".

**Let's bring
Oklahoma into
the future!**

Thank you!

Advanced Nuclear Energy

Oklahoma Senate Energy and
Telecommunications Meeting

October 31, 2023

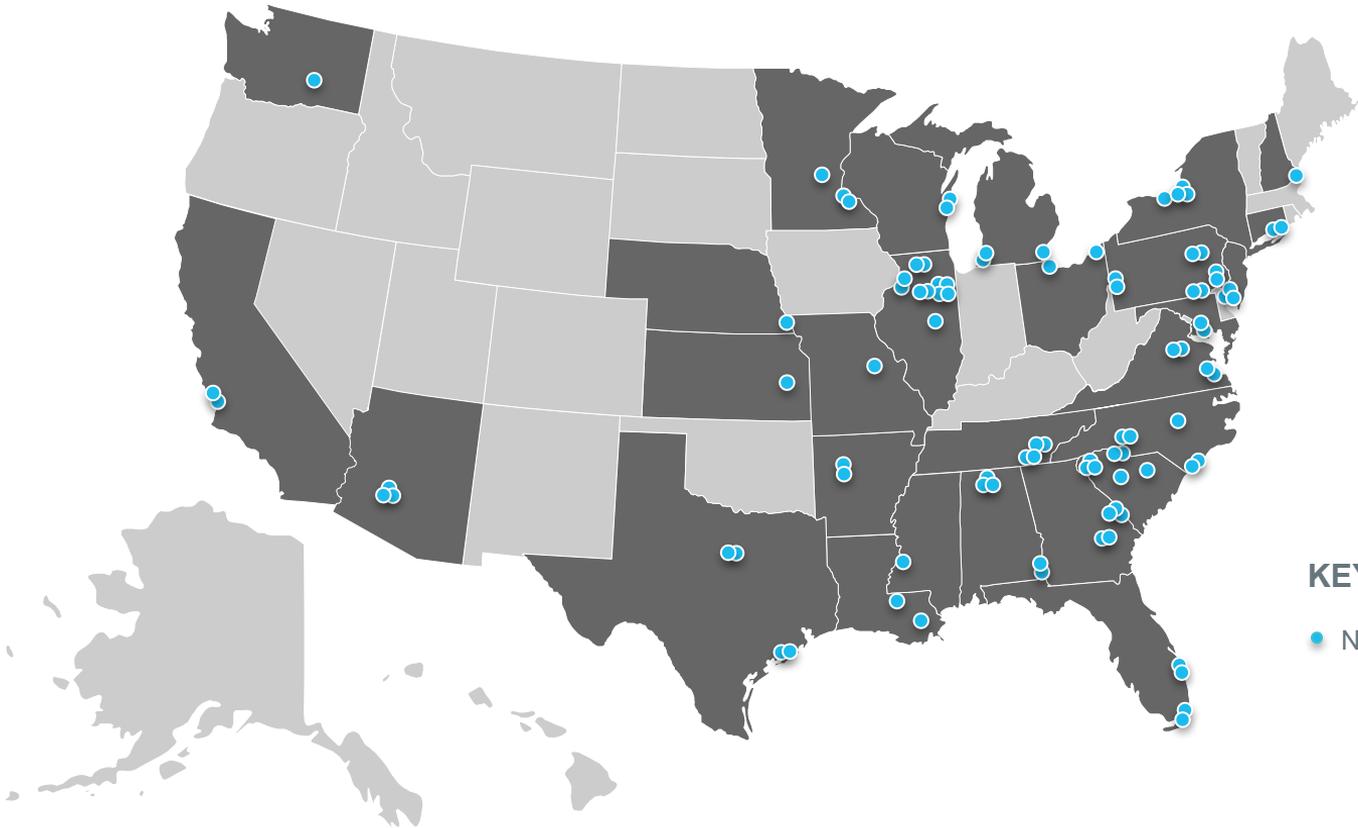


Marc Nichol
Executive Director, New Nuclear

©2022 Nuclear Energy Institute



Nuclear Provides Majority of Emissions-Free Electricity



Nuclear generated 19% of electricity in the U.S.

From 93 reactors at 53 plant sites across the country

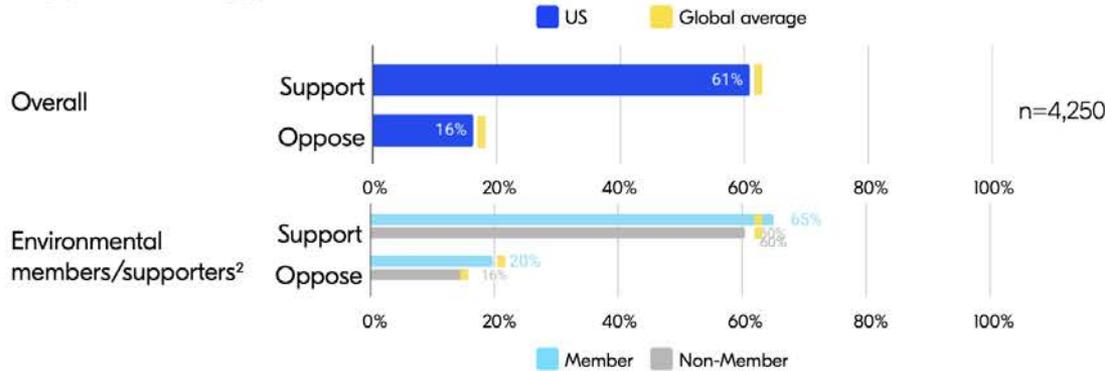
KEY

● Nuclear power reactor

Strong Support for Nuclear Energy



Support vs. opposition¹



Support by...

Gender

Men	73%
Women	50%

Age

18-34	58%
35-54	62%
55+	62%

Income

Low income (under 50k USD)	52%
Medium income (50k-100k USD)	60%
High income (100k+ USD)	70%

Political Affiliation

Democrat	61%
Independent	60%
Republican	66%

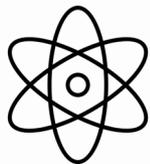
Top 5 nuclear sentiments³

(% agree)

We need a way to produce more and more energy for our economy to keep growing	76%
We need to be building capacity for more energy, not just trying to use less	63%
We need nuclear energy in the mix, along with renewables, if we are to meet our climate goals	60%
Leaving nuclear waste behind is just wrong, however safe it is	59%
We should use advanced nuclear energy to reduce our dependence on other countries	58%

Lowest System Cost Achieved by Enabling Large Scale New Nuclear Deployment

Lowest Cost System

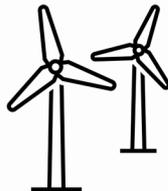


Nuclear is 43% of generation (>300 GW of new nuclear)



Wind and solar are 50%

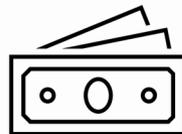
Energy System with Nuclear Constrained



Wind and Solar are 77% of generation



Nuclear is 13% (>60 GW of new nuclear)



Increased cost to customers of \$449 Billion

Both scenarios are successful in reducing electricity grid GHG emissions by over 95% by 2050 and reducing the economy-wide GHG emissions by over 60%

System Benefits of Advanced Reactors

Long term price stability

- Low fuel and operating costs

Reliable dispatchable generation

- 24/7, 365 days per year, years between refueling (Capacity factors >92%)

Efficient use of transmission

- Land utilization <0.1 acre/TWh (Wind =1,125 acre/TWh; Solar 144 acre/TWh)

Environmentally friendly

- Zero-carbon emissions, one of lowest total carbon footprints
- Many SMRs are being designed with ability for dry air cooling

Integration with renewables and storage

- Paired with heat storage and able to quickly change power

Black-start and operate independent from the grid

- Resilience for mission critical activities
- Protect against natural phenomena, cyber threats and EMP

Types of Advanced Reactors

Range of sizes and features to meet diverse market needs

Micro Reactors
< 20MWe



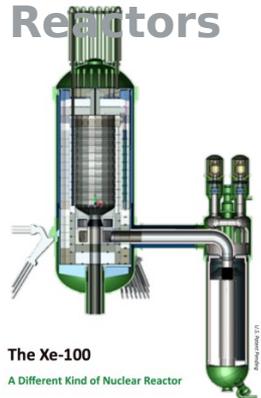
Oklo (shown)
Approximately a dozen
in development

LWR SMRs
<300MWe



NuScale (shown)
GEH BWRX-300
Holtec SMR-160
Westinghouse AP300

High Temp Gas Reactors



X-energy (shown)
Several in development

Liquid Metal



TerraPower Natrium™ (shown)
Several in development

Molten Salt



Terrestrial (shown)
Several in development

Non-Water Cooled
Most <300MWe, some as large as 1,000 MWe



Learn more about innovative technologies with the Nuclear Innovation Alliance.

Strong Federal Support for Advanced Reactors

- DOE funding 12 different designs, >\$5B over 7 years
- Infrastructure Bill
 - \$2.5B funding for two demonstration projects
- Inflation Reduction Act
 - PTC: At least \$30/MWh for 10 years
 - ITC: 30% of investment
 - Both can be monetized, include 10% bonus for siting in certain energy communities
 - Loan Guarantees – up to \$40B in expanded authority
 - HALEU Fuel - \$700M
- CHIPS Act
 - Financial assistance to States, Tribes, local governments and Universities

September 2022

Current Federal Policy Tools to Support New Nuclear

The following is a list of current policy tools that could directly support the deployment of new nuclear, could potentially indirectly support the deployment or planning for new nuclear, and that currently support the deployment of new nuclear.

Programs that Could Directly Support Deployment of New Nuclear

Clean Electricity Production Credit – 45V

The Inflation Reduction Act created a new technology-neutral tax credit for all clean electricity technologies, including advanced nuclear and power uprates that are placed into service in 2023 or after. The bill does not change the existing Advanced Nuclear Production Tax Credit but precludes credits from being claimed under both programs. The value of the credit will be at least \$30 per megawatt-hour, depending on inflation, for the first ten years of plant operation. The credit phases out when carbon emissions from electricity production are 75 percent below the 2022 level. The following is a link to the statutory language.

<https://uscode.house.gov/view.xhtml?req=45v&#treeor1&#tree&num=2&#history&#editionprelim&#granuleid=USC-prelim-title26-section45V>

Clean Electricity Investment Credit – 48E

As an alternative to the clean electricity PTC, the Inflation Reduction Act provided the option of claiming a clean electricity investment credit for zero-emissions facilities that is placed into service in 2025 or thereafter. This provides a credit of 30 percent of the investment in a new zero-carbon electricity facility, including nuclear plants. Like the other credits, this investment tax credit can be monetized. The ITC phases out under the same provisions as the clean electricity PTC.

<https://uscode.house.gov/view.xhtml?req=48e&#treeor1&#tree&num=4&#history&#editionprelim&#granuleid=USC-prelim-title26-section48E>

Both the clean electricity PTC and ITC include a 10-percentage point bonus for facilities sited in certain energy communities such as those that have hosted coal plants. The following is a link to the statutory language.

Credit for Production from Advanced Nuclear Power Facilities – 45I

The nuclear production tax credit 26 USC 45I provides a credit of 1.8 cents per kilowatt-hour up to a maximum of \$125 million per tax year for 8 years. Only the first 6000 MW of new capacity installed after 2005 for a design approved after 1988 are eligible for the tax credit. The credit does not include a direct pay provision, so the owner will need to have offsetting taxable income to claim the credit or transfer the credit to an eligible project partner. The following is a link to the statutory language.

<https://uscode.house.gov/view.xhtml?req=45i&#treeor1&#tree&num=5&#history&#editionprelim&#granuleid=USC-prelim-title26-section45I>

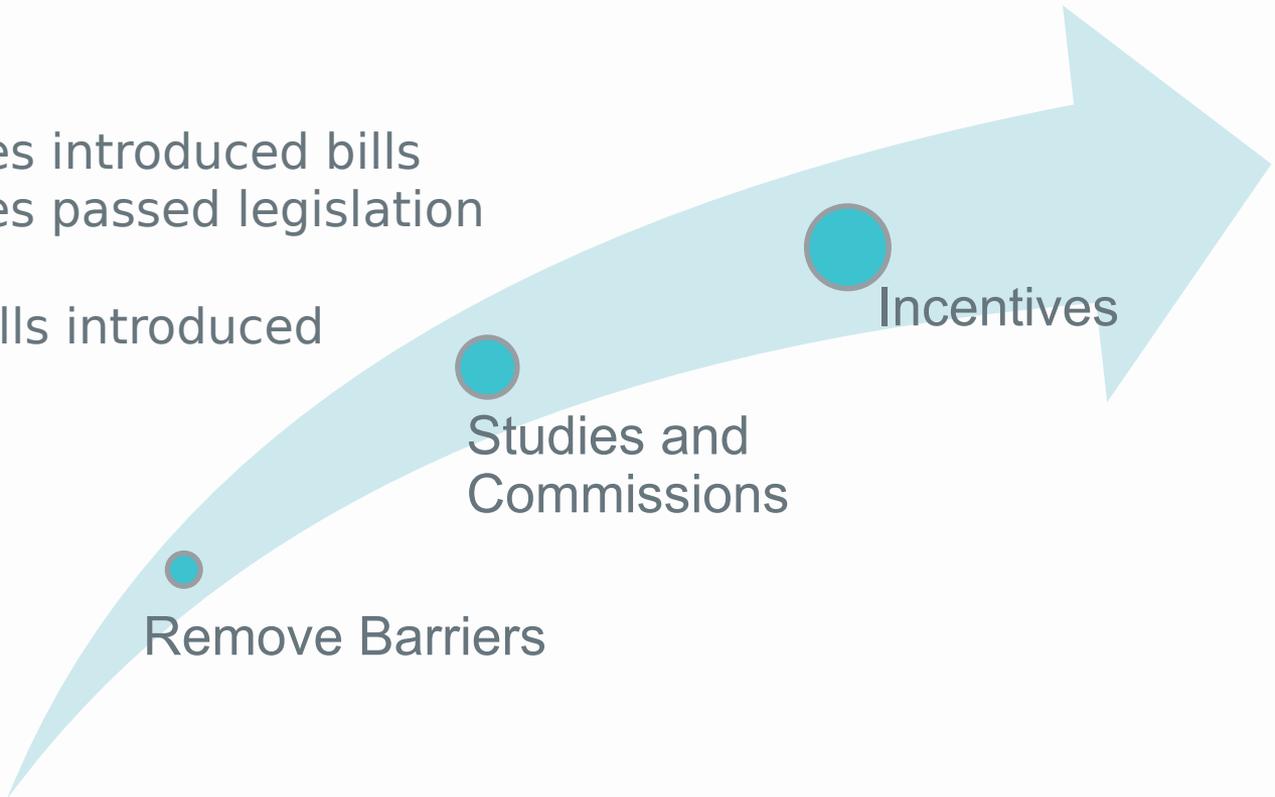
State Action for Advance Reactors

2022

- 19 States introduced bills
- 11 States passed legislation

2023

- 200+ bills introduced



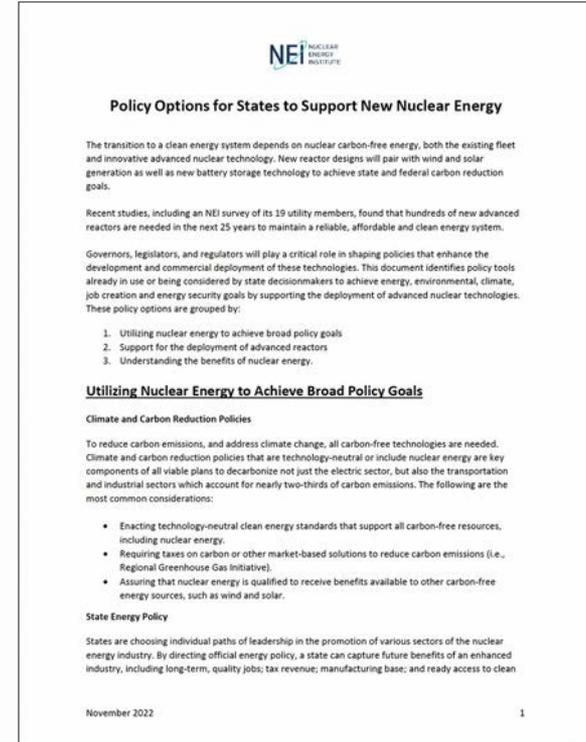
Remove Barriers

Studies and Commissions

Incentives

State Options to Support Advanced Reactors

- Reliability Portfolio Standards
- Value-based market/regulatory system
- Tax incentives (e.g., property)
- Advanced cost recovery
- Workforce and infrastructure



2023 State Actions for Nuclear Energy

CES and Defining Clean

Minnesota, Idaho, Tennessee,
North Carolina

Workforce Development

Virginia, West Virginia

SMR Incentive

Indiana

SMR Study

North and South Dakotas

Moratorium Repeal

Illinois

Energy Study

Colorado

Hydrogen/Nuclear

Nebraska

Nuclear Working Group or Authority

Kentucky, Connecticut, Ohio

Coal to Nuclear

Texas

Fuel Recycling

Arkansas

Interim SMR Study

Oklahoma, West Virginia

Nuclear Energy Caucus

Washington, Texas, Michigan

2023 Governor Actions

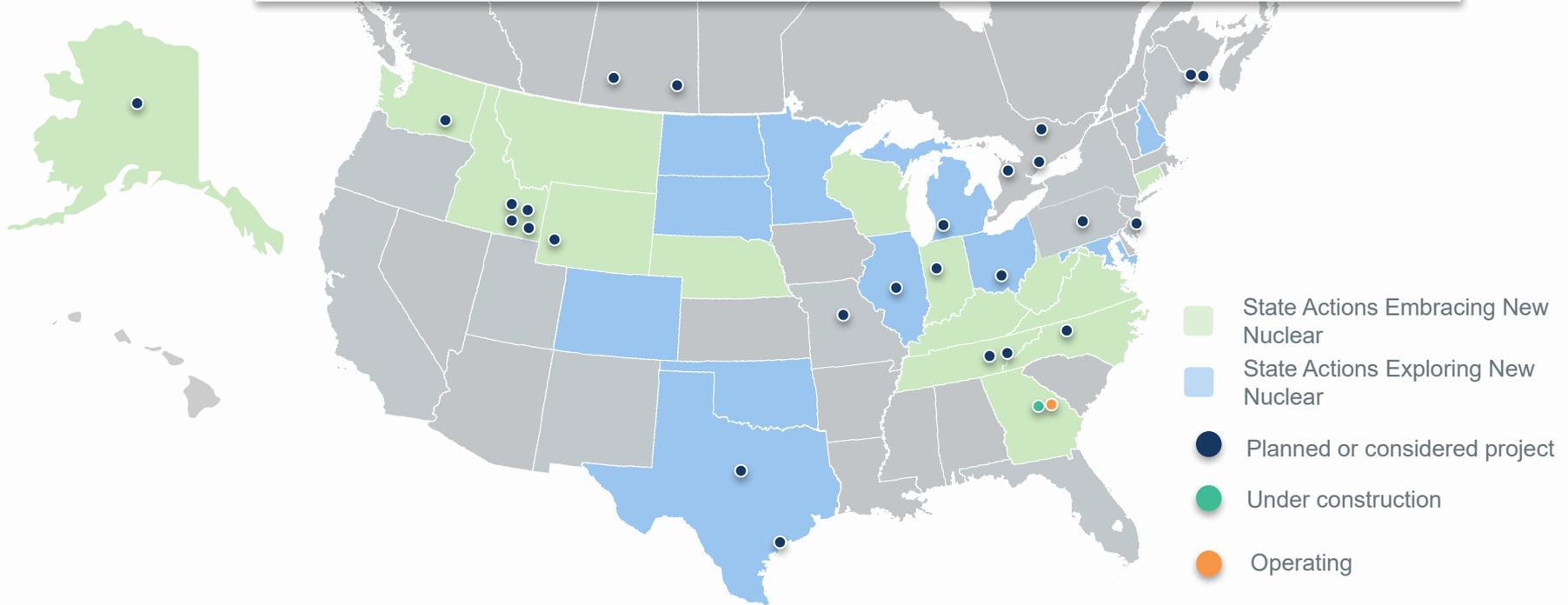
- Tennessee's Governor Lee's **\$50 Million** for Incentives and Nuclear Energy Advisory Council
- Michigan's Governor Whitmer **\$150 Million** for re-activating Palisades in state budget
- Governor Abbott directing the PUCT to create a working group to develop rules for advanced nuclear

State Regulatory Activities

State	Activity (2022-2023 action or impact to the commission related to existing and new nuclear)
California	<ul style="list-style-type: none">The commission currently has an open rulemaking to consider extending operations at Diablo Canyon nuclear plant.
Indiana	<ul style="list-style-type: none">2022 legislation requires the commission to adopt rules by July 1, 2023 granting the certificates for the construction and purchase or lease of SMRs.
Louisiana	<ul style="list-style-type: none">Commissioner Eric Skrmetta has put forward a directive for the PSC to study new nuclear.
Michigan	<ul style="list-style-type: none">Following 2022 legislation, the commission has selected a firm to conduct a study examining existing and new nuclear generation in the state. The study is due back to the PSC in March 2024.
Montana	<ul style="list-style-type: none">In 2022, the commission opened an investigative docket to address issues of resource adequacy and risk surrounding Montana's energy future. Discussions are ongoing and include nuclear's role to address the state's energy needs.
New Jersey	<ul style="list-style-type: none">Several pending bills would require the commission to consider the use and development of diverse energy sources such as nuclear when preparing the state's Energy Master plan.Pending legislation would establish a new Clean Energy Advocate position within the BPU. The position will facilitate coordination among various state agencies on clean energy projects, including nuclear.
North Carolina	<ul style="list-style-type: none">The commission approved a carbon plan in Dec. 2022 requiring Duke Energy Carolinas to pursue the license extensions for its existing nuclear fleet and authorizes the utility to incur project development costs associated with new nuclear generation.Duke Energy filed its combined carbon plan and IRP in NC on Aug. 17. The IRP includes 600 MW of new nuclear by 2035, with the first SMR operating in 2034. It also names the Belews Creek coal site for the SMR.A bill (vetoed by the governor) is back with the legislature (with a likely override and litigation) that would change the composition of the commission (from 7 members to 5), and how they are appointed (from all governor appointed to several House and Senate appointments).
South Carolina	<ul style="list-style-type: none">Duke Energy filed its IRP on Aug. 15, 2023, which includes developments from NC's carbon plan, such as support for existing reactors and studying new nuclear.
South Dakota	<ul style="list-style-type: none">The commission approved a 2023 order allowing deferred accounting treatment for costs to Northwestern Energy to study new nuclear. The utility identified nuclear in its most recent IRP submitted in 2022.
Texas	<ul style="list-style-type: none">Governor's Executive Order establishes a new nuclear working group through the PUCT. Commissioner Jimmy Glodfelty will be leading the group, with recommendations due back to the Governor in 2024.
Virginia	<ul style="list-style-type: none">Legislation considered this session would have required the commission to establish an SMR pilot program.Dominion Energy submitted its 2023 IRP to the commission, which includes 5 scenarios. All but one, a least-cost plan the company was required to model but said it doesn't consider a true "path forward," include the development of SMRs.
West Virginia	<ul style="list-style-type: none">Legislation considered this session would have directed the commission to create advanced reactor regulations.

Advanced Nuclear Deployment Plans

Projects in planning or under consideration in U.S. and Canada for Operation ~2030



QUESTIONS?

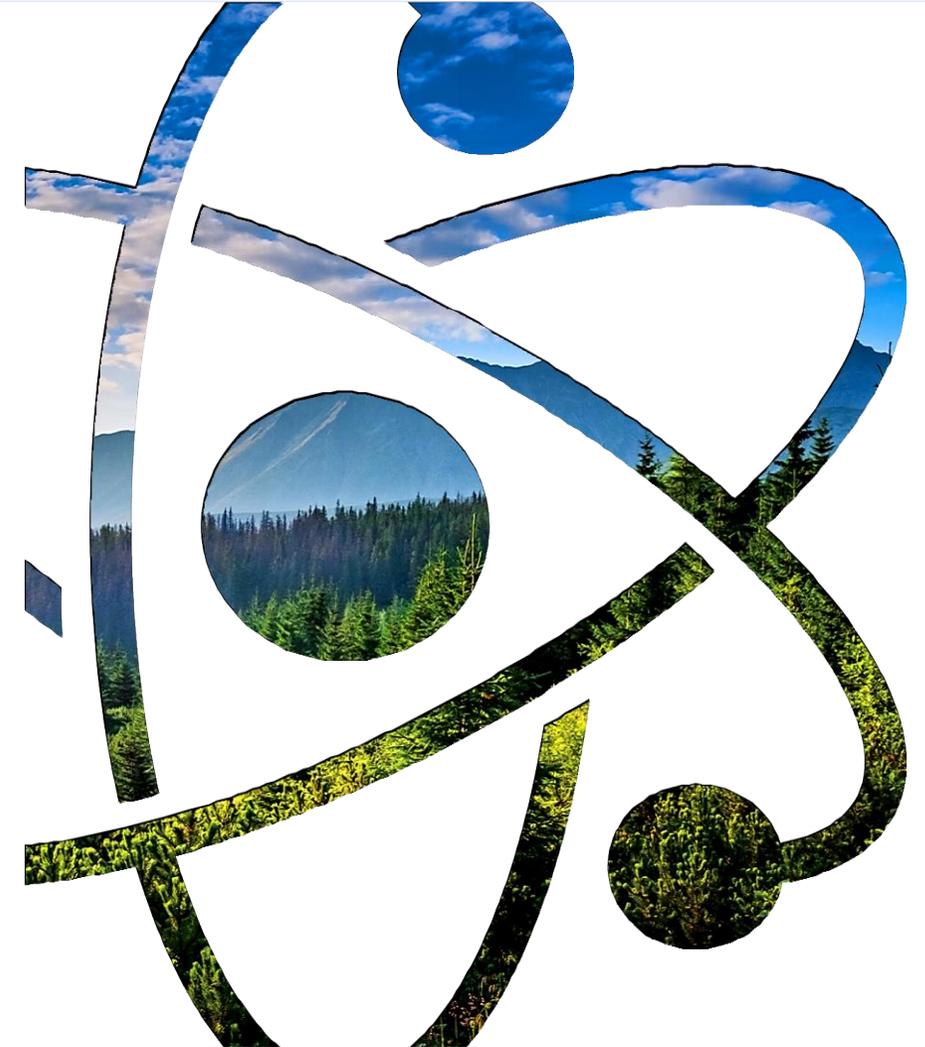


AP1000®, eVinci™ and AP300™ are trademarks or registered trademarks of Westinghouse Electric Company LLC, its affiliates and/or its subsidiaries in the United States of America and may be registered in other countries throughout the world. All rights reserved. Unauthorized use is strictly prohibited. Other names may be trademarks of their respective owners.

Oklahoma Interim Study

October 31, 2023

Dr. Rita Baranwal
Senior Vice President

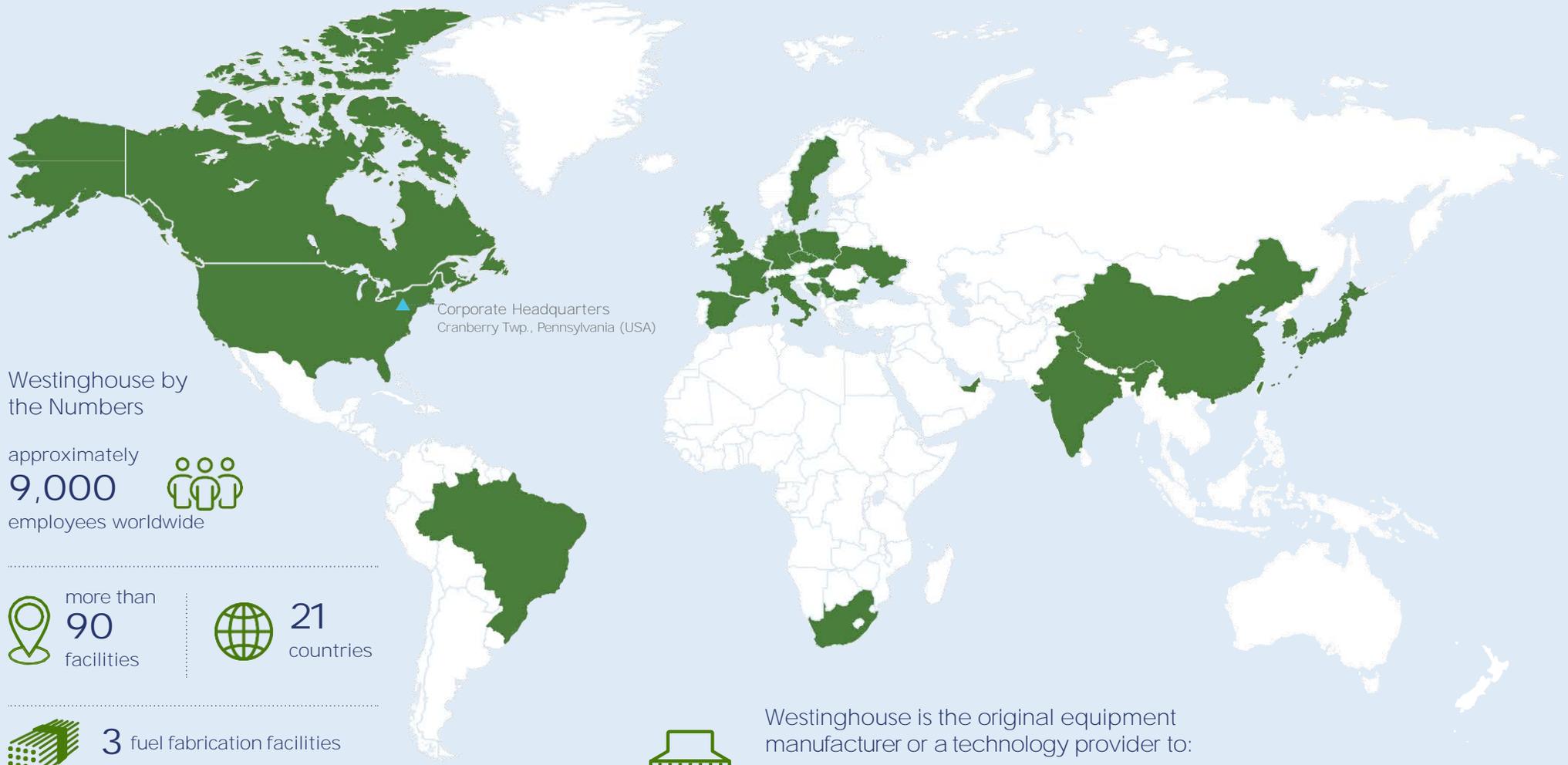




Westinghouse global presence

Legend

- ▲ Corporate Headquarters
- Countries with Westinghouse Presence



Westinghouse by the Numbers

approximately
9,000 
employees worldwide

more than
90
facilities

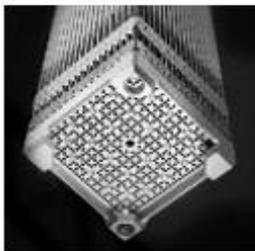
 **21**
countries

 **3** fuel fabrication facilities



Westinghouse is the original equipment manufacturer or a technology provider to:
~50% of the global nuclear reactor fleet,
delivering capacity of ~190,000 carbon-free MWe

Global Products & Services Portfolio Snapshot



Nuclear Fuel



Instrumentation & Control



Staffing Services



Components & Manufacturing



Field Services and Plant Modifications



New Plants



Engineering Services



Decontamination & Decommissioning Solutions



Project and Engineering Services



Energy Systems

A portfolio of innovative nuclear solutions

AP1000® PWR

1100+ MW_e

Most advanced nuclear technology operating in the world today with record-setting performance

TECHNICAL CAPABILITIES

- Passive Safety Systems
- Simplified Active Systems
- Proven NSSS Components; Canned Motor Pumps
- Compact Footprint
- Modular Construction
- Digital I&C and Advanced Control Room
- Load Follow Capability
- Global Licensing Pedigree

AP300™

300 MW_e

Only SMR based on deployed, operating & advanced reactor technology

TECHNICAL CAPABILITIES

- 300MWe (990MWth) 1-loop PWR with demonstrated reliability
- Based on the fully licensed & operating AP1000 technology
- Utilizes identical passive safety systems used in the AP1000 reactor to maintain safe shutdown condition
- Ultra-compact, simplified design reduces construction timeframes
- Maximizes use of established supply chain
- Less than 0.4 acres needed for safety related buildings

eVinci Microreactor™

5 MW_e

Microreactor designed for safe and reliable electricity and heat generation



TECHNICAL CAPABILITIES

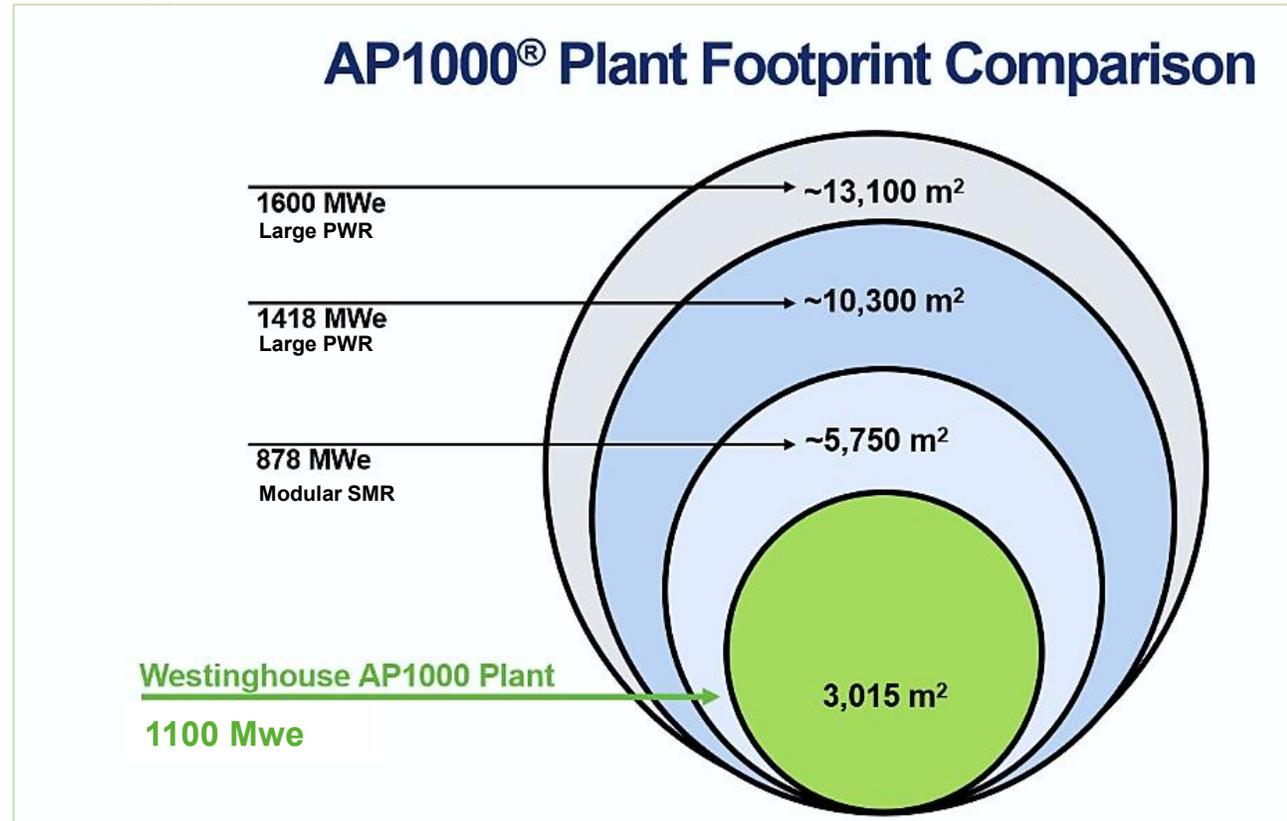
- 5 MWe + ~8MWth @ 200C cogeneration
- Minimum 8 year refueling cycle
- Transportable for ease of installation and elimination of spent fuel storage on site
- Cost-competitive plant lifecycle
- Minimal onsite personnel
- Mature technology, manufacturing, and regulatory readiness
- High speed load following capability



AP1000 Technology

Safe, simple, proven

- **Generation III+ plant**; most advanced in operation today
- **Fully passive safety systems** and 72+ hour coping after station blackout
- Optimized design utilizing **advanced modular construction**
- **Licensed by nuclear regulators** in Europe, USA, and China
- **Record-setting** operational performance
- Advanced, **load-following** capabilities
- **Safe, clean, reliable energy**





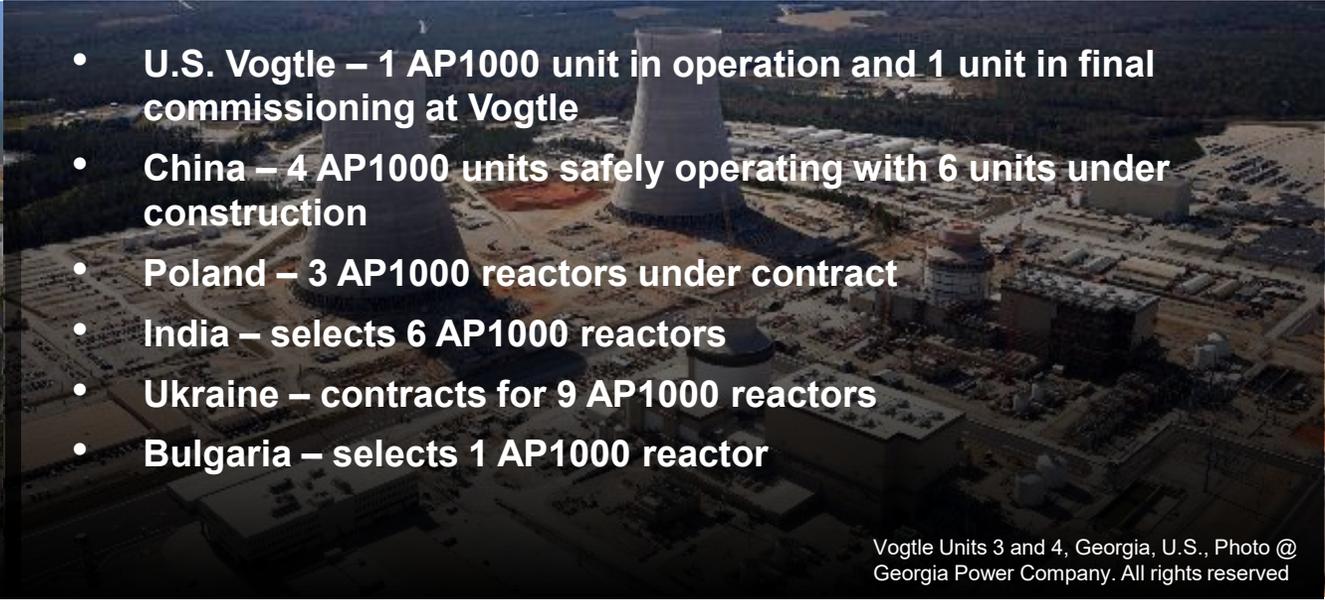
AP1000 Technology

Record-setting operations



Sanmen 1, a Westinghouse AP1000 Technology, received a perfect score by the World Association of Nuclear Operators (WANO)*

Sanmen Site, China
Photo © Sanmen Nuclear Power Company, Ltd. All rights reserved

- 
- **U.S. Vogtle – 1 AP1000 unit in operation and 1 unit in final commissioning at Vogtle**
 - **China – 4 AP1000 units safely operating with 6 units under construction**
 - **Poland – 3 AP1000 reactors under contract**
 - **India – selects 6 AP1000 reactors**
 - **Ukraine – contracts for 9 AP1000 reactors**
 - **Bulgaria – selects 1 AP1000 reactor**

Vogtle Units 3 and 4, Georgia, U.S., Photo @ Georgia Power Company. All rights reserved

**WANO assesses nuclear power plants in terms of nuclear safety, power generation, effectiveness, equipment reliability, etc.*

***Information courtesy of Southern Company*



AP300 SMR

Only SMR based on deployed, operating & advanced reactor technology



Proven Technology

20 AP1000 reactor-years of safe operations

Based on the fully licensed & operating AP1000 technology.



Advanced Safety

More than **30** years licensing advanced passive technologies with global regulators

We pioneered passive safety systems. AP300 utilizes identical passive safety systems used in the AP1000 reactor to maintain safe shutdown condition.



Readily Deployable

Less than **0.4** acres needed for safety related buildings

Ultra-compact, simplified design reduces construction timeframes. Maximizes use of established supply chain.





Proven Technology

Leveraging AP1000 technology with demonstrated industry leading reliability



300MWe (990MWth) 1-loop PWR
with demonstrated reliability



Westinghouse AP1000 reactor
passive safety technology



Reduces overall components
creating a simpler plant compared
to other SMRs



Identical Technology as
AP1000 including:

- | Design & licensing methodologies
- | Major equipment & components
- | Passive safety systems
- | Proven Fuel
- | I&C systems
- | Proven Supply Chain
- | Constructability lessons learned
- | Steel-Composite structural modules
- | O&M procedures & practices
- | Fast load follow capabilities



Readily Deployable by 2030's

Proven pedigree throughout the plant lifecycle ensures deployment & operations success



Technology Readiness

Tens of millions of hours dedicated to AP1000 reactor development
5 AP1000 reactors operating, 1 nearing completion, more pending



Licensing Certainty

Based on licensed & operating AP1000 technology, the only technology to be fully licensed by the U.S NRC



Established Supply Chain

Incumbent AP1000 suppliers can deliver major equipment
Demonstrated capability to localize supply chain



Modular Construction

Simplified, modular, ultra compact nuclear island (costliest portion of any reactor) reduces construction costs/schedule



Reliable O&M

Record setting AP1000 operational & outage performance
Targeting **+80-year** life cycle





AP300 SMR Advantage

AP300 SMR reduces development risks and increases market potential

	Key Factors	Competitor #1	Competitor #2	Competitor #3	Competitor #4	Competitor #5	Westinghouse AP300™ SMR
DEVELOPMENT RISKS	Design & Technology	Low	Medium	Medium	Medium	Medium	Low
	Full Licensing	Low	Medium	Medium	Low	Low	Low
	Fuel Cycle	Low	Low	Low	Low	Low	Low
	Skills Availability & Supply Chain Maturity	Medium	Medium	Medium	Medium	Medium	Low
MARKET POTENTIAL	Design for manufacturability & construction	++	++	+	+	+	+++
	Cost Competitiveness & LCOE	+++	++	+	+	+	+++
	Utility Market: O&M synergies	++	+	+	++	+	+++
	Versatility: electricity, steam, H ₂ , Storage	++	+++	+++	+++	+++	+++

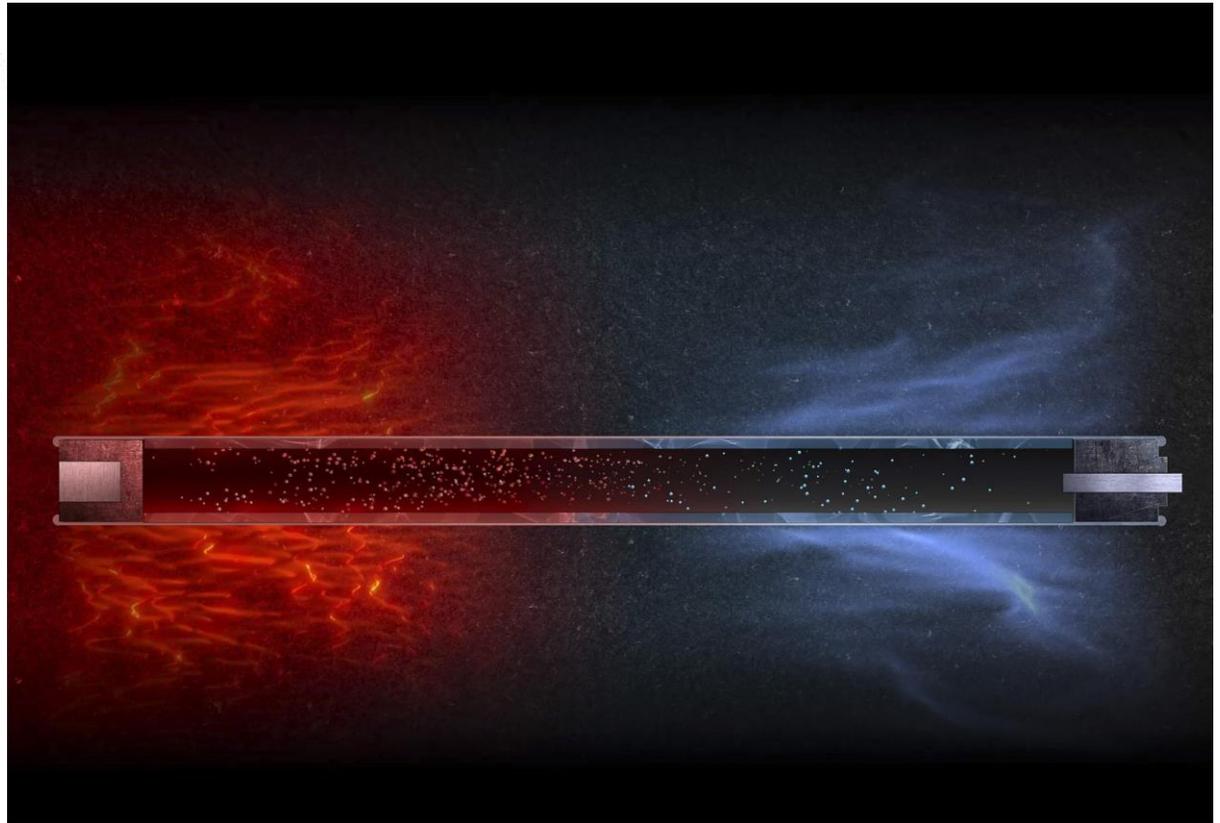


eVinci Microreactor

Clean energy beyond the grid

Nuclear battery designed for safe and reliable clean energy generation

- **5 MWe with ~7MWth @ 170° C usable heat**
- ~13.5MWth @ >700° C heat only
 - Commercial deployment before end of this decade
- **8+ years of operation without refueling**
- Transportable for ease of installation and elimination of spent fuel storage on site
- **Cost-competitive plant lifecycle**
- Minimal site construction and onsite personnel
- High speed load following capability





eVinci Microreactor

Combined heat and power capability





eVinci Microreactor

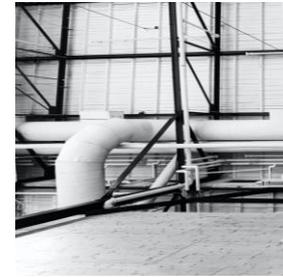
Distributed energy wherever it's needed



**Remote
Mining
Operations**



**Industrial
Process
Heat**



**District
Heating**



**Space
Missions**



**Off-grid
Communities**



**Hydrogen
Generation**



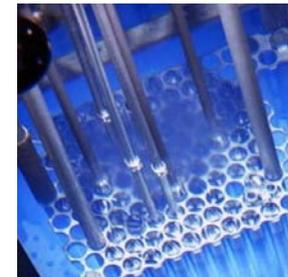
Universities



**Strategic
Military
Installations**



**Critical
Infrastructure**



**Research
Reactors**

Thank You

[westinghousenuclear.com](https://www.westinghousenuclear.com)



Westinghouse



Westinghouse
Electric Company



@WECNuclear



Westinghouse
Electric Company



wecchinanuclear



PRESENTATION TITLE

MIKE ROSS

SR. VICE PRESIDENT, EXTERNAL AFFAIRS &
STAKEHOLDER RELATIONS

MROSS@SPP.ORG

*Helping our members work together to keep
the lights on... today and in the future.*



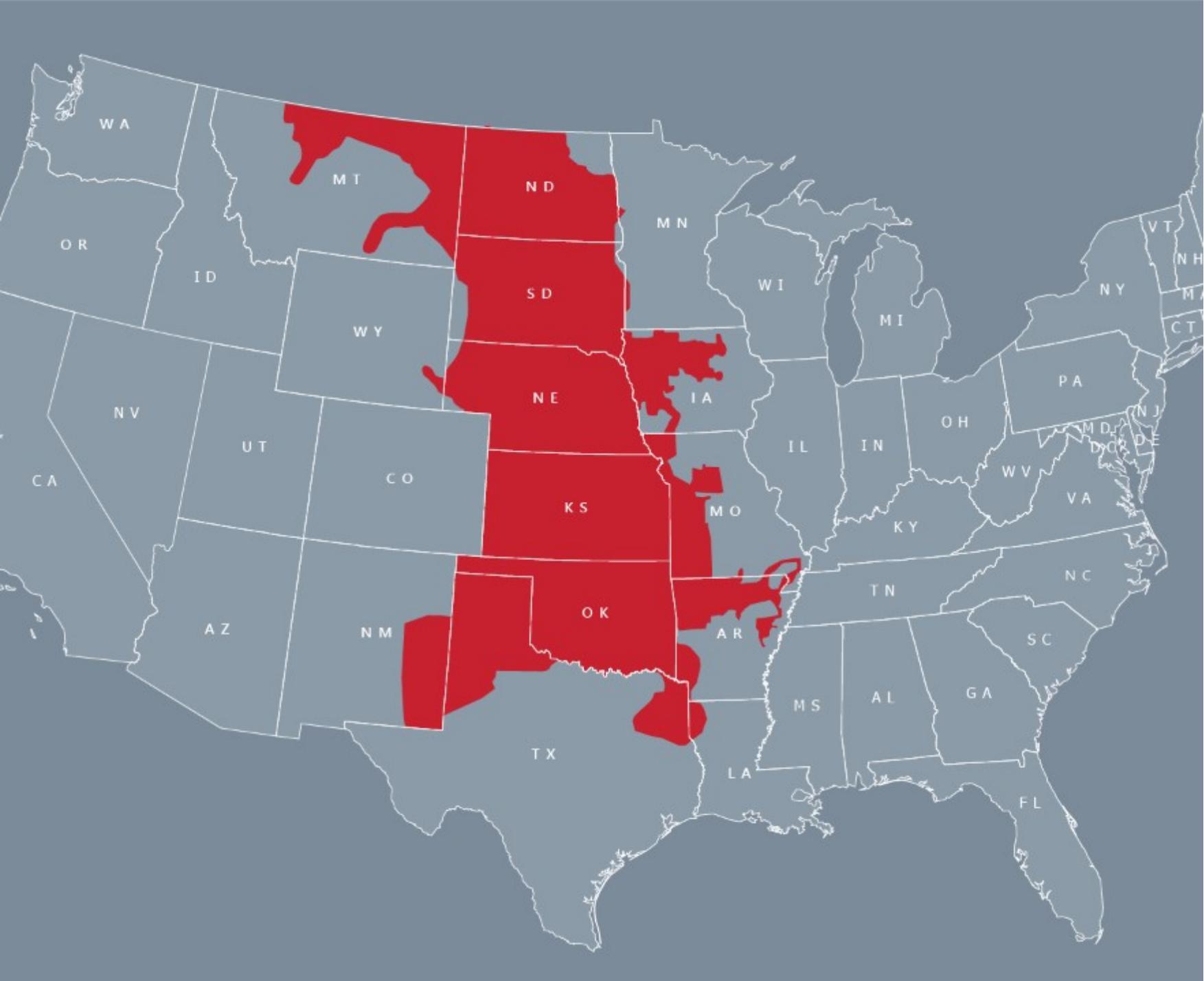
SouthwestPowerPool



SPPorg



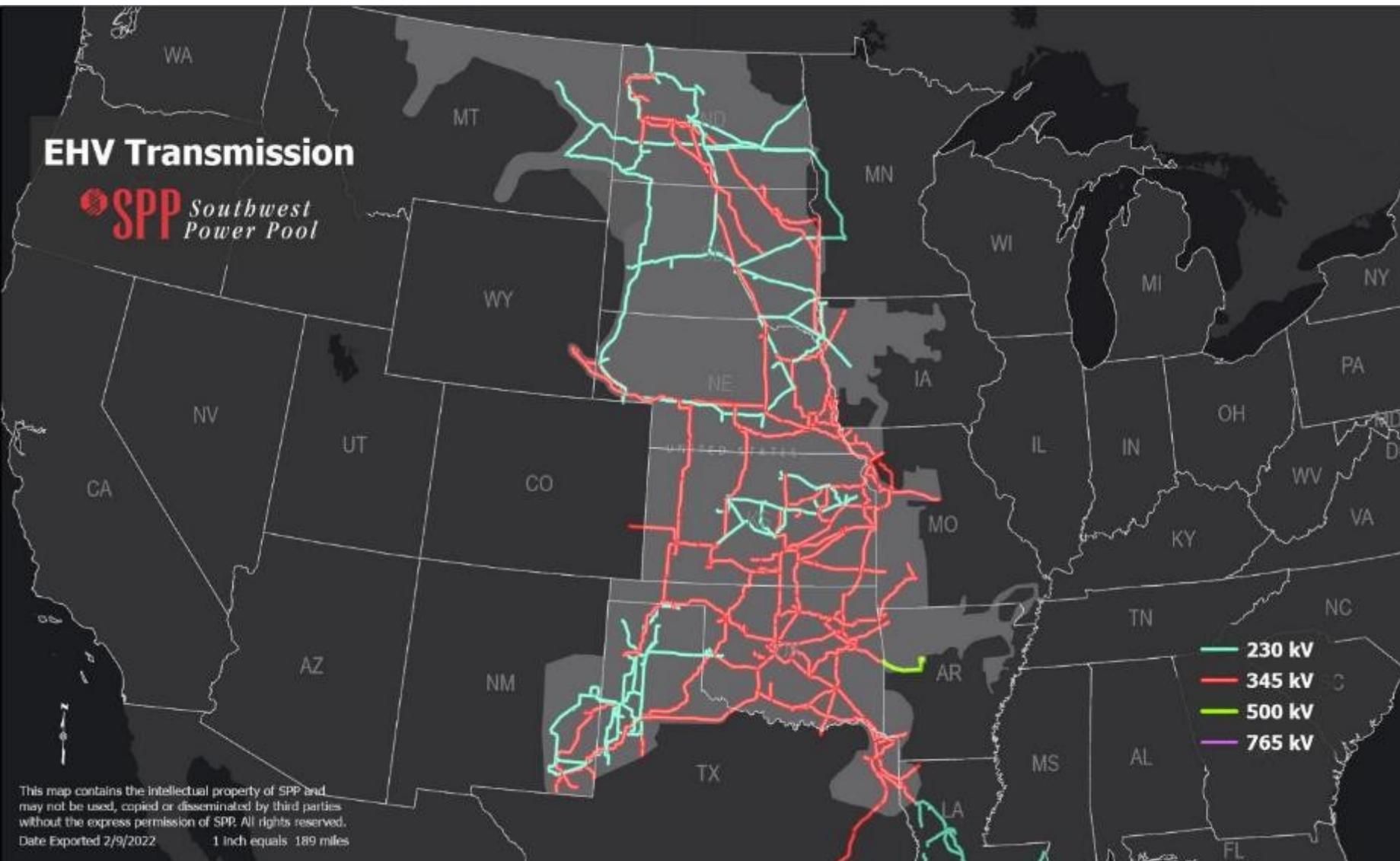
southwest-power-pool



RTO OPERATING REGION

- **552,885** square mile service territory
- **~18 million** population served
- **994*** generating plants
- **5,199*** substations

* In SPP's balancing authority area

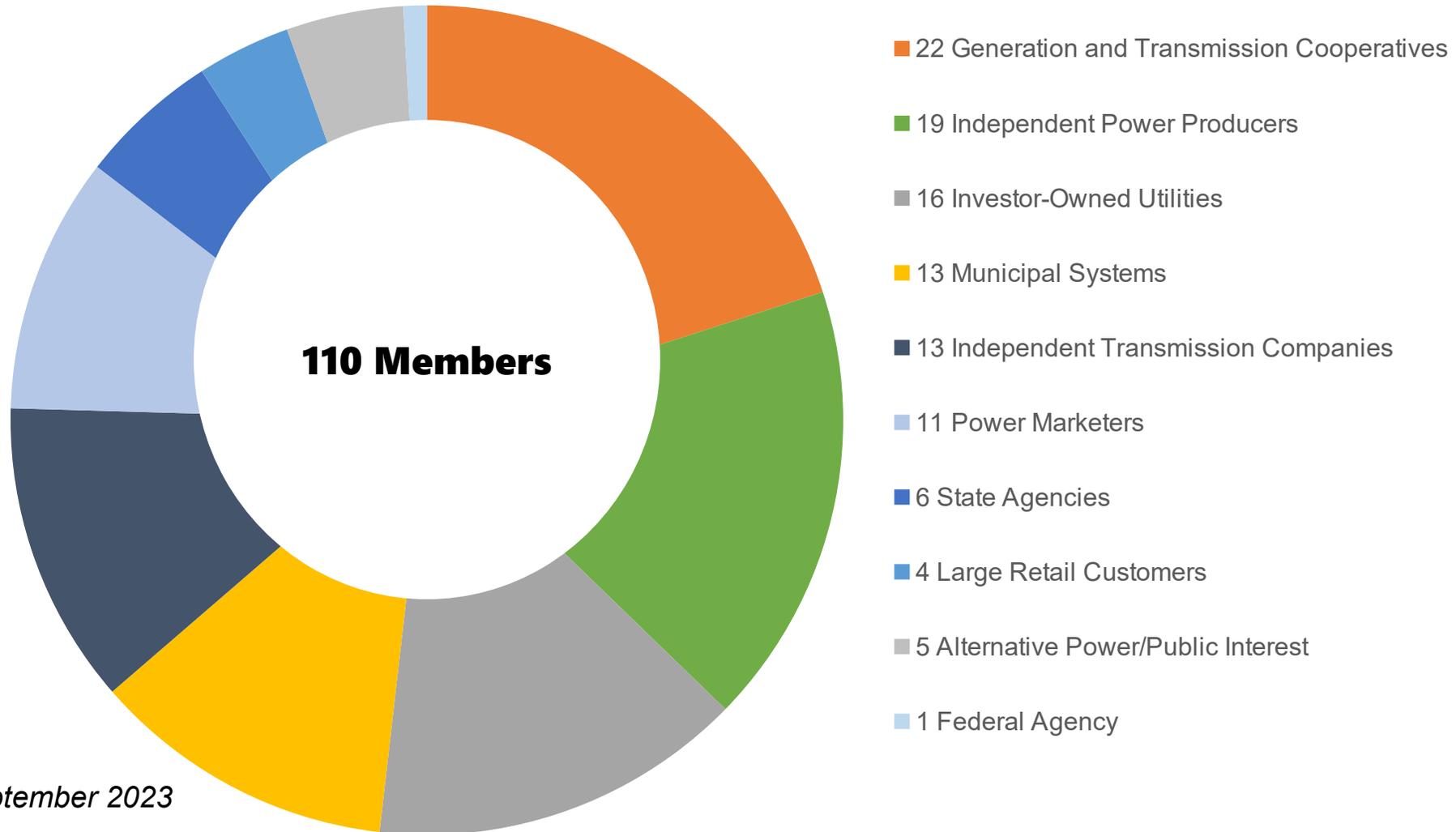


MILES OF TRANSMISSION: 72,004

- 69 kV 19,367
- 115 kV 16,751
- 138 kV 9,930
- 161 kV 5,686
- 230 kV 7,543
- 345 kV 12,636
- 500 kV 91

As of Feb. 14, 2023

SPP's 110 Members: Independence Through Diversity



Updated September 2023

SPP'S INDEPENDENT BOARD OF DIRECTORS



Susan Certoma, Chair
Elected January 2019, term ends December 2024
Member, Finance Committee



Elizabeth Moore, Vice Chair
Elected October 2020, term ends December 2023
Member, Human Resources Committee
Member, Oversight Committee



Barbara Sugg, President & CEO
Elected January 2020
Chair, Corporate Governance Committee
Member, Strategic Planning Committee



Larry Altenbaumer
Elected July 2005, term ends December 2023
Vice Chair, Corporate Governance Committee
Member, Oversight Committee



Bronwen Bastone
Elected January 2020, term ends December 2022
Chair, Human Resources Committee



John Cupparo
Elected January 2022
Chair, Strategic Planning Committee
Member, Human Resources Committee



Ray Hepper
Elected October 2022
Member, Oversight Committee
Member, Finance Committee



Josh Martin
Elected October 2003, term ends December 2023
Chair, Oversight Committee
Ex Officio Member, Corporate Governance Committee



Ben Trowbridge
Elected January 2022
Chair, Finance Committee
Member, Oversight Committee



Steve Wright
Elected October 2022
Member, Strategic Planning Committee

2023 REGIONAL STATE COMMITTEE



**Andrew French, RSC
President**
Kansas Corporation
Commission



**Will McAdams,
RSC Secretary/Treasurer**
Public Utility Commission of
Texas



Randel Christmann*
North Dakota Public
Service Commission



Kristie Fiegen*
South Dakota Public Utilities
Commission



Mike Francis*
Louisiana Public Service
Commission



Todd Hiatt*
Oklahoma Corporation
Commission



Chuck Hutchison
Nebraska Power Review
Board



Sarah Martz
Iowa Utilities Board



Pat O'Connell
New Mexico Public
Regulation Commission



Scott Rupp
Missouri Public Service
Commission



Justin Tate
Arkansas Public Service
Commission



John Tuma
Minnesota Public
Utilities Commission

REGIONAL STATE COMMITTEE

Retail regulatory commissioners from:

Arkansas	Minnesota	North Dakota
Iowa	Missouri	Oklahoma
Kansas	Nebraska	South Dakota
Louisiana	New Mexico	Texas

Primary responsibility for:

- Cost allocation for transmission upgrades
- Approach for regional resource adequacy
- Allocation of transmission rights in SPP markets

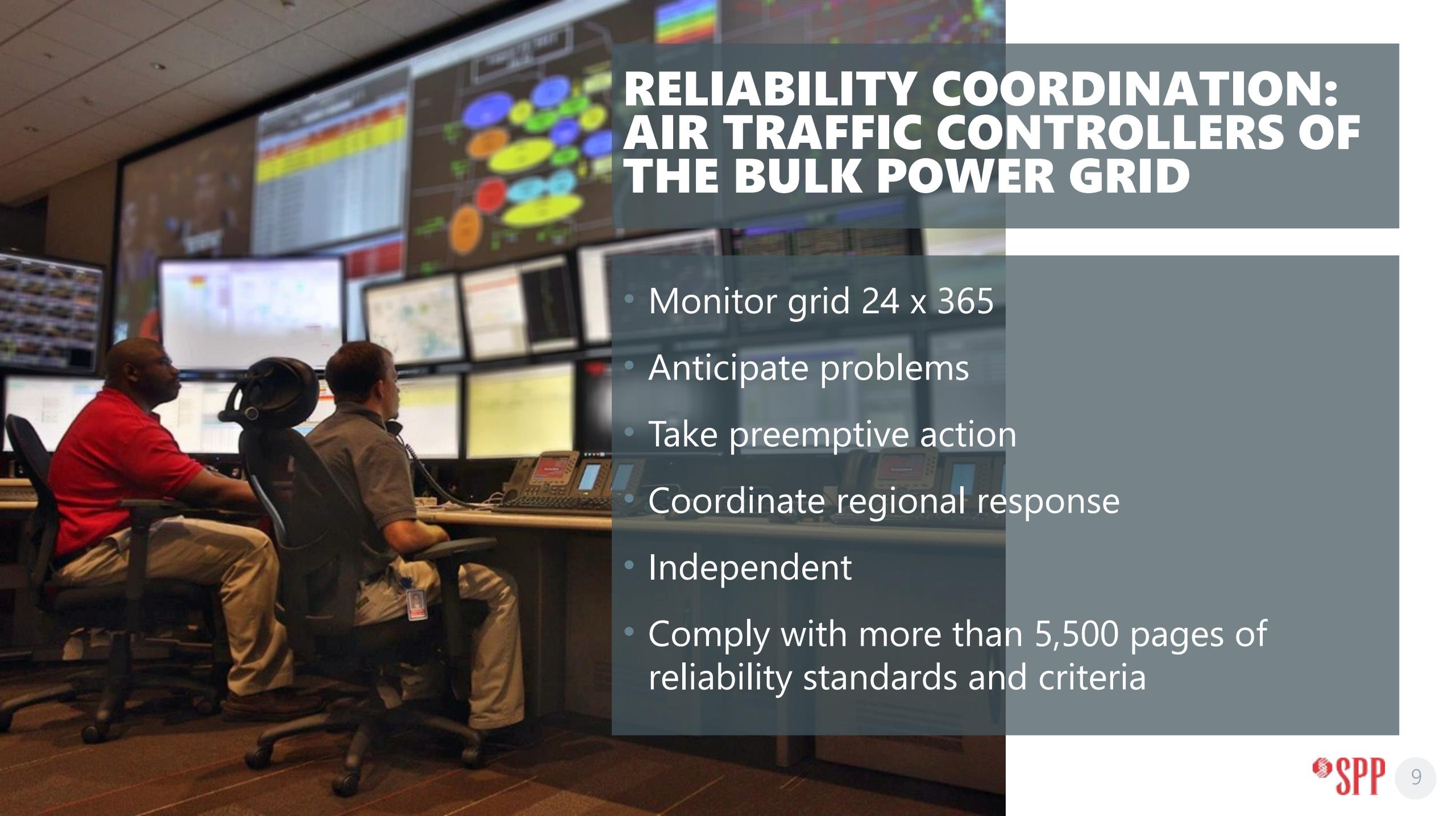


OUR MAJOR SERVICES

- Facilitation
- Reliability Coordination
- Balancing Authority
- Transmission Service/Tariff Administration
- Market Operation
- Transmission Planning
- Training

OUR APPROACH:

Regional, Independent, Cost-Effective and Focused on Reliability



RELIABILITY COORDINATION: AIR TRAFFIC CONTROLLERS OF THE BULK POWER GRID

- Monitor grid 24 x 365
- Anticipate problems
- Take preemptive action
- Coordinate regional response
- Independent
- Comply with more than 5,500 pages of reliability standards and criteria

BALANCING ELECTRIC SUPPLY AND DEMAND

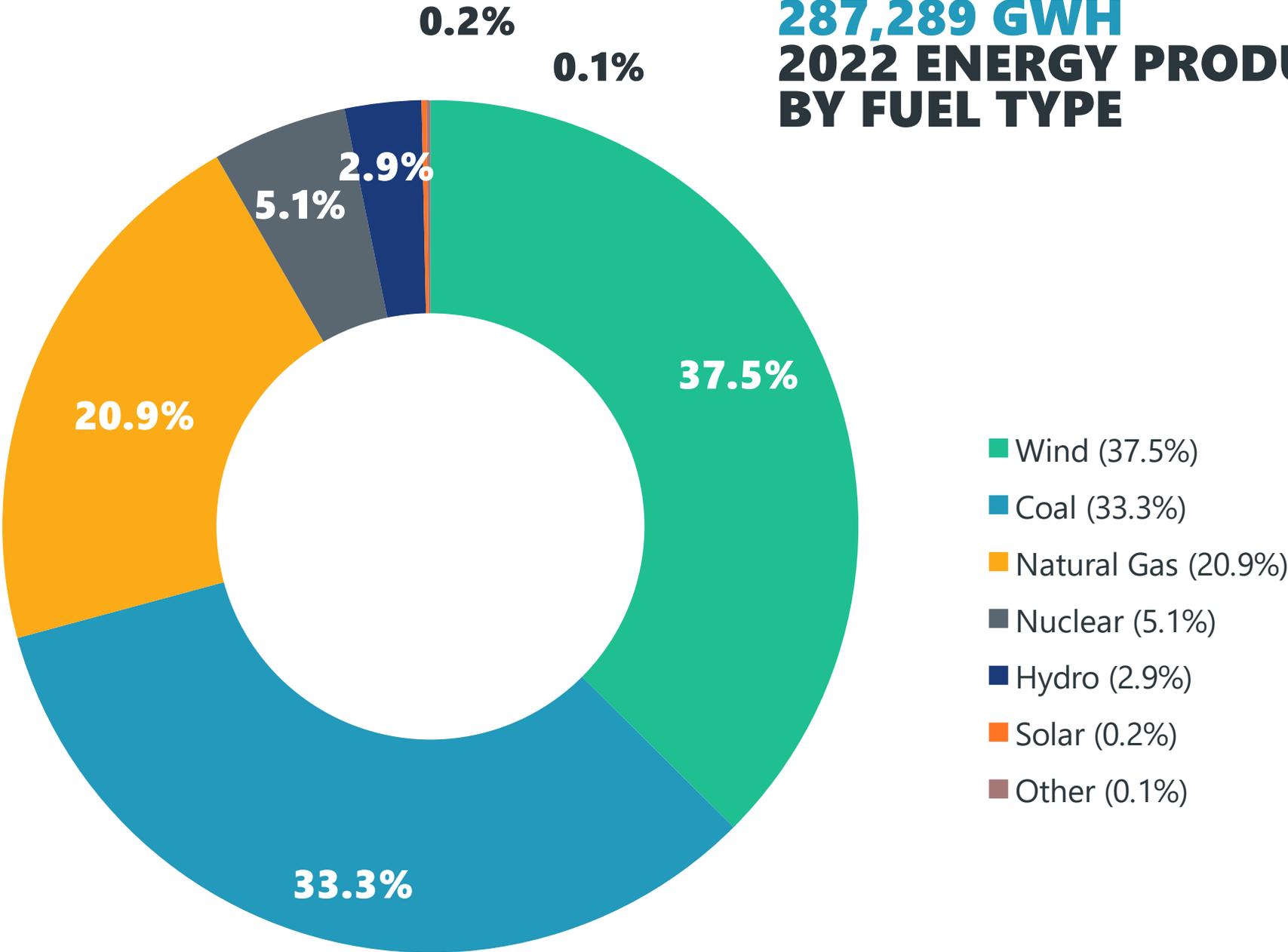
SUPPLY/GENERATION

- **98,608 MW** Nameplate Capacity
- **64,486 MW** Accredited Capacity *(as of Summer 2022)*

DEMAND/LOAD

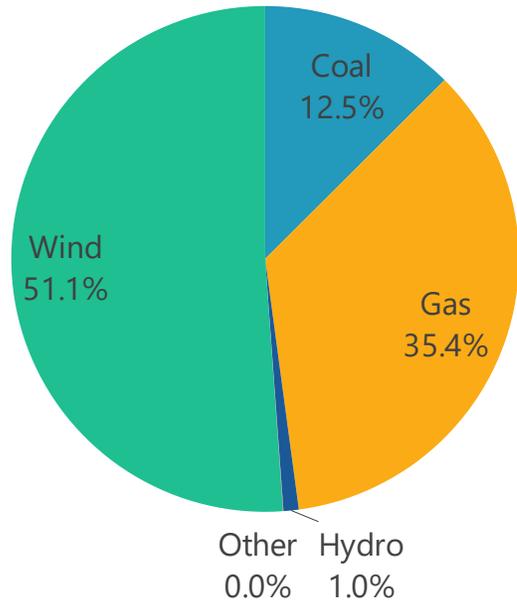
- **56,184 MW** all-time coincident peak load (8/21/23)
- **47,157 MW** Winter peak (12/22/22)

287,289 GWH 2022 ENERGY PRODUCTION BY FUEL TYPE



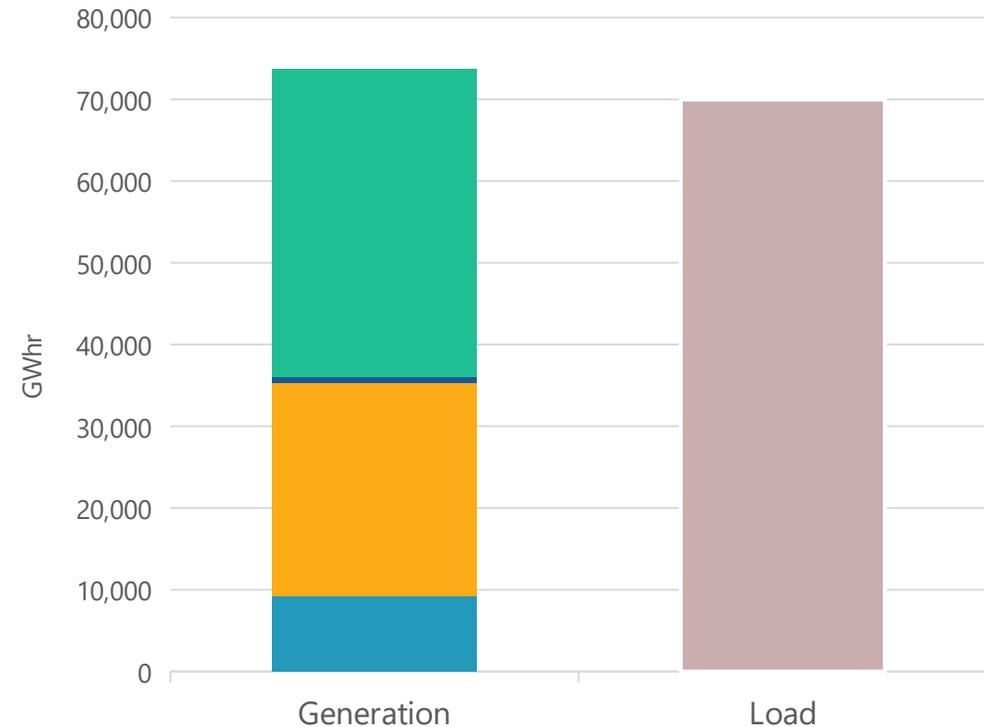
OKLAHOMA GENERATION AND LOAD

Fuel Mix: SPP Generation in Oklahoma, 2022



■ Coal ■ Gas ■ Hydro ■ Nuclear
■ Other ■ Solar ■ Wind

Oklahoma Generation and Demand, 2022



■ Coal ■ Gas ■ Hydro ■ Nuclear
■ Other ■ Solar ■ Wind ■ Load

SPP MARKETS

Transmission Service

Participants buy & sell use of transmission lines owned by different parties

Integrated Marketplace

Participants buy & sell wholesale electricity in day-ahead & real-time

- **Day-Ahead Market** commits cost-effective & reliable generation for region
- **Real-Time Balancing Market** economically dispatches generation to balance real-time generation & load while ensuring reliability
- **Consolidated Balancing Authority** operates as a single region

Western Energy Imbalance Service Market

Contract-based, real-time balancing market in Western Interconnection

MARKETPLACE BENEFITS

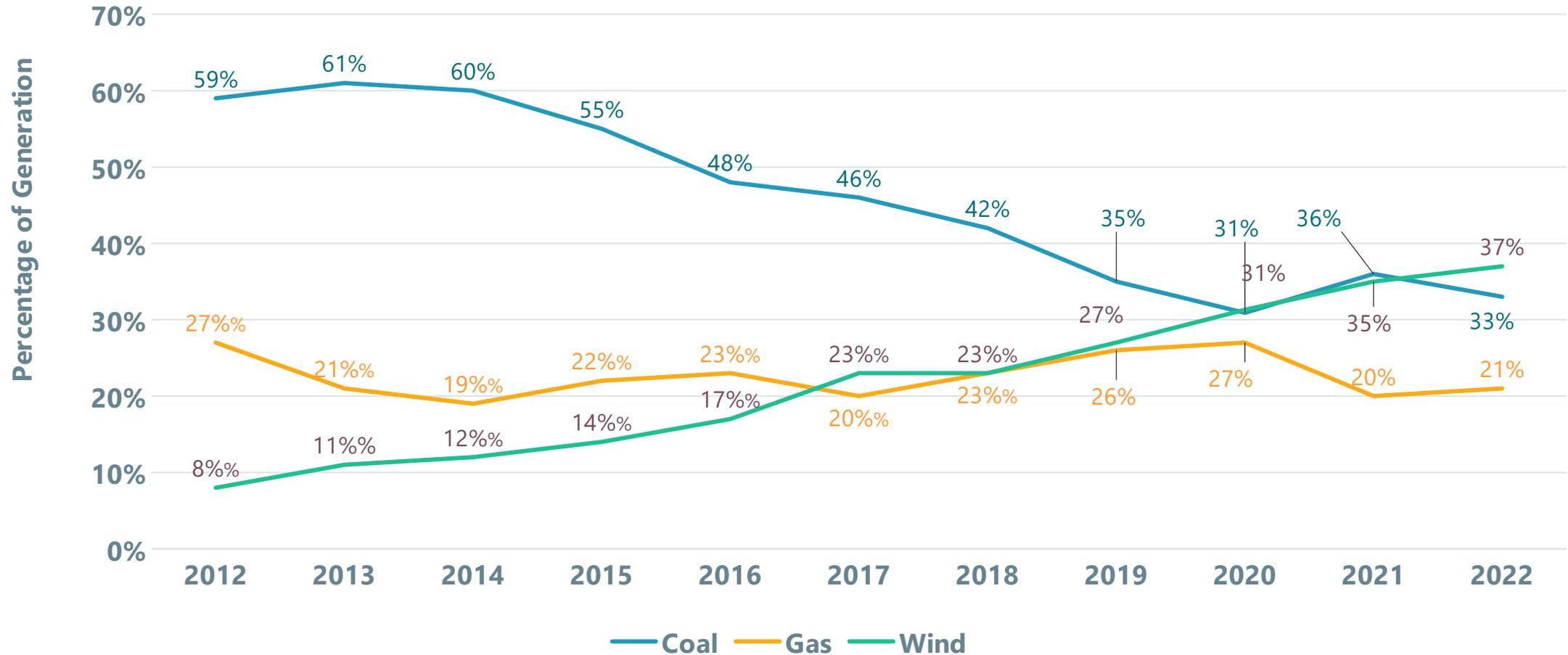
- **\$7.95 billion** in cumulative benefits as of January 2023
- **\$1.8 billion** annual savings
- **\$30/MWh** Lowest-cost wholesale energy in nation*
- **1,000% increase** in renewable energy capacity
 - 3 GW in 2009 to 35 GW in 2023

** FERC 2021 calculations based on year-to-date spot power prices*

OUR EVOLVING ENERGY MIX

Coal and gas use has decreased, while wind has increased

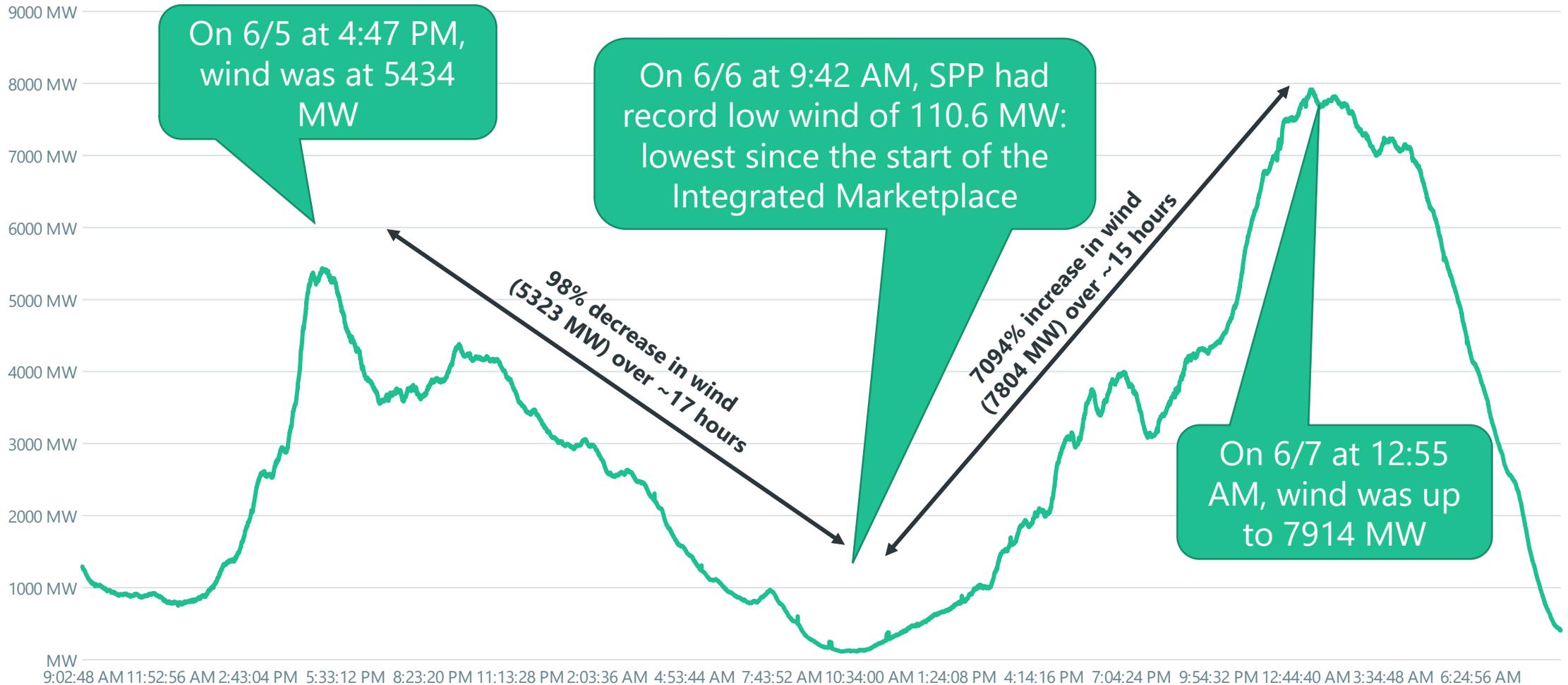
Trend By Year



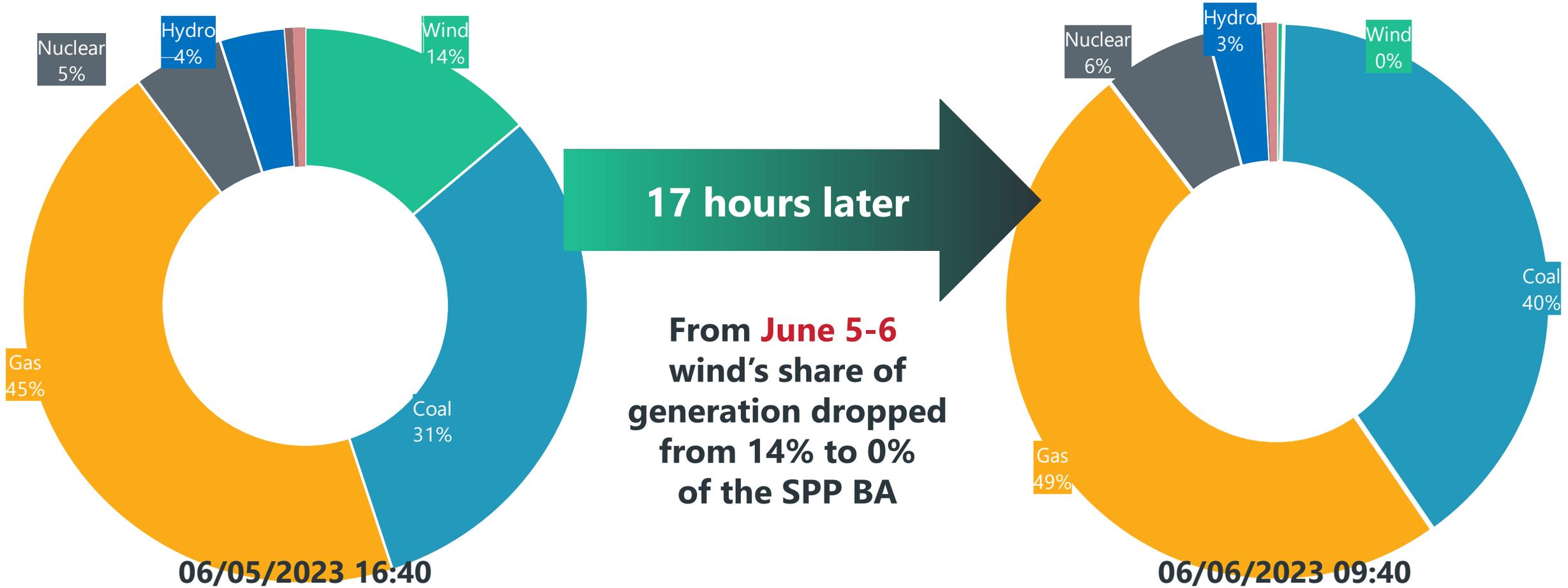
WIND IN SPP'S SYSTEM

- **30,487 MW** Wind installed today
 - 14,758 turbines at 244 wind resources in the eastern interconnection (most are 80m hub height)
- **23,838 MW** Maximum wind output (3/16/23)
- **110 MW** Minimum wind output (6/6/23)
- **88.51%** All-time maximum wind penetration (3/29/22)
- **37.5%** Average wind penetration (2022)

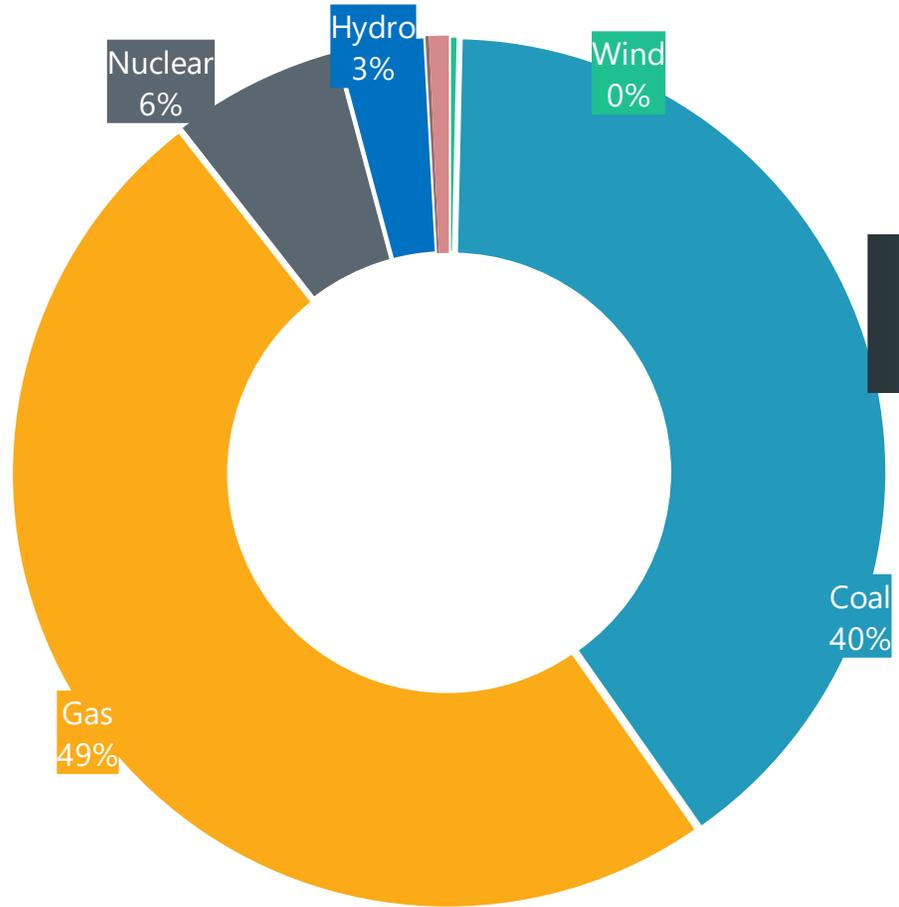
WHY FUEL DIVERSITY MATTERS: WIND RAMP AND RECORD LOW (6/6/23) IN INTEGRATED MARKETPLACE



THE DIFFERENCE A DAY MAKES: JUNE 5-6, 2023



THE DIFFERENCE A DAY MAKES: JUNE 6-7, 2023

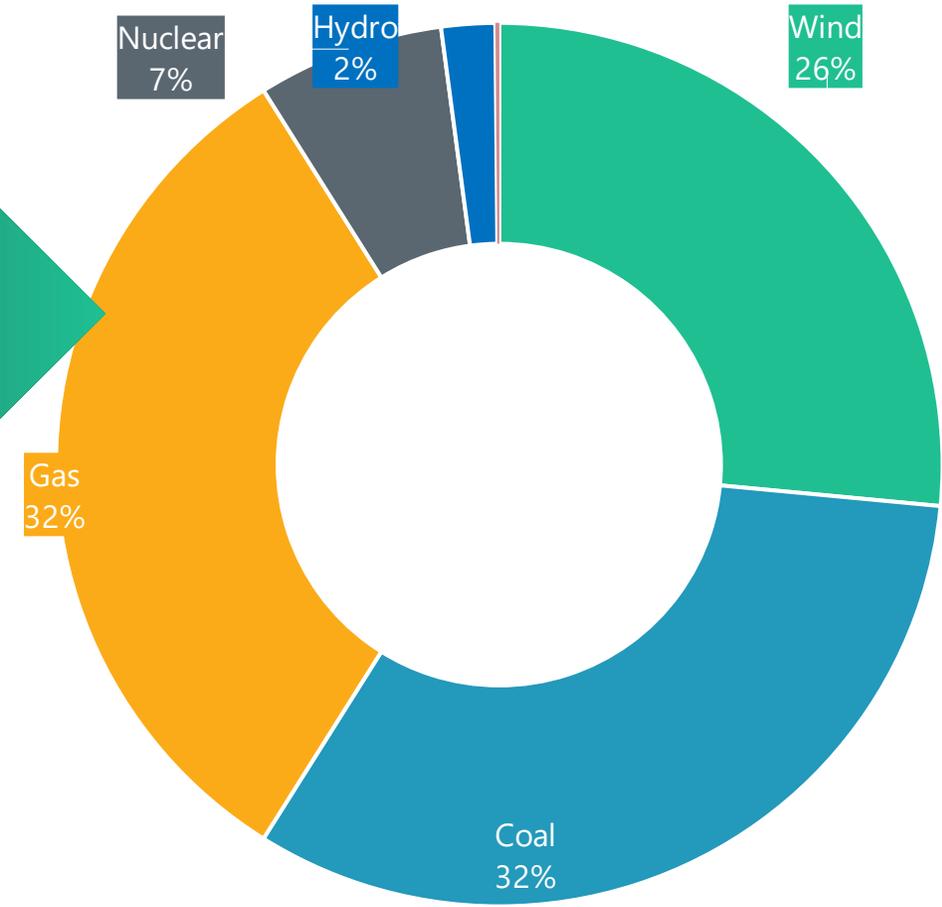


06/06/2023 09:40



17 hours later

From **June 6-7** wind's share of generation increased from 0% to 27% of the SPP BA



06/07/2023 12:40

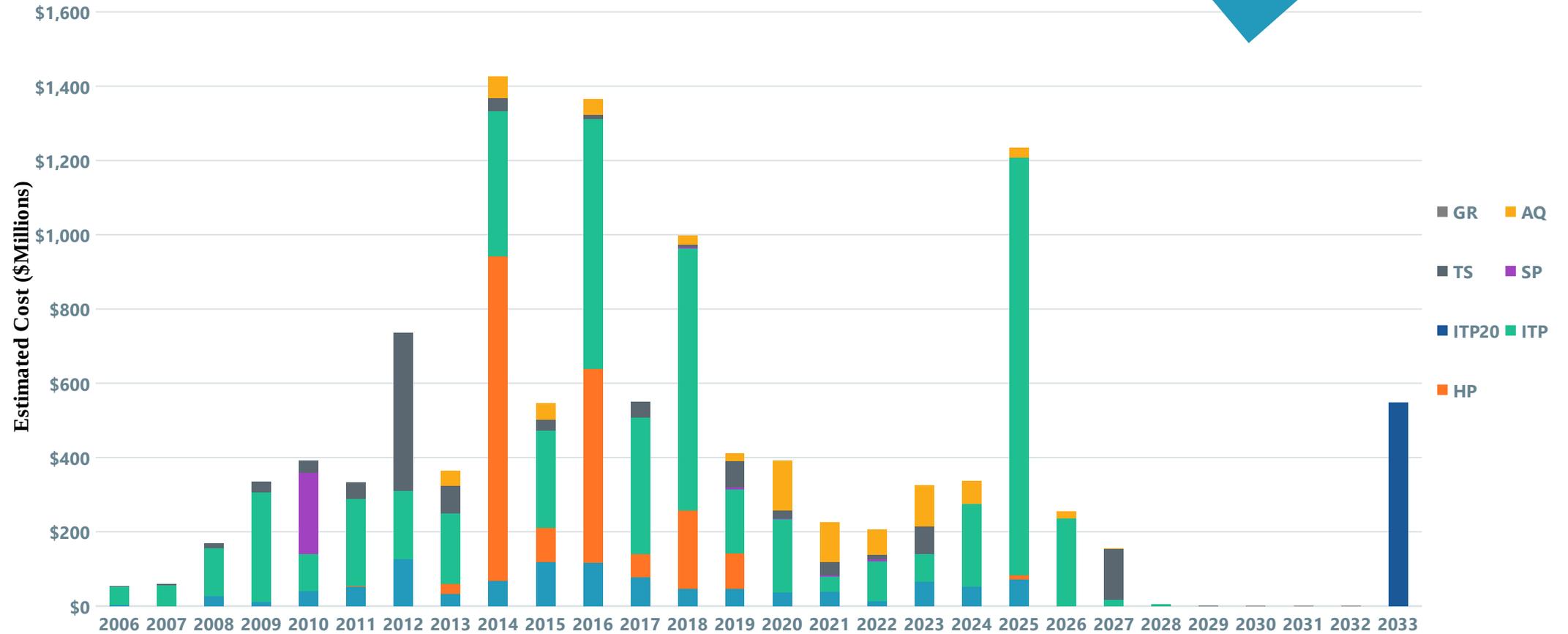
TRANSMISSION PLANNING CONSIDERATIONS

Must take into account a number of considerations, including

- Reliability
- Economics
- Public Policy

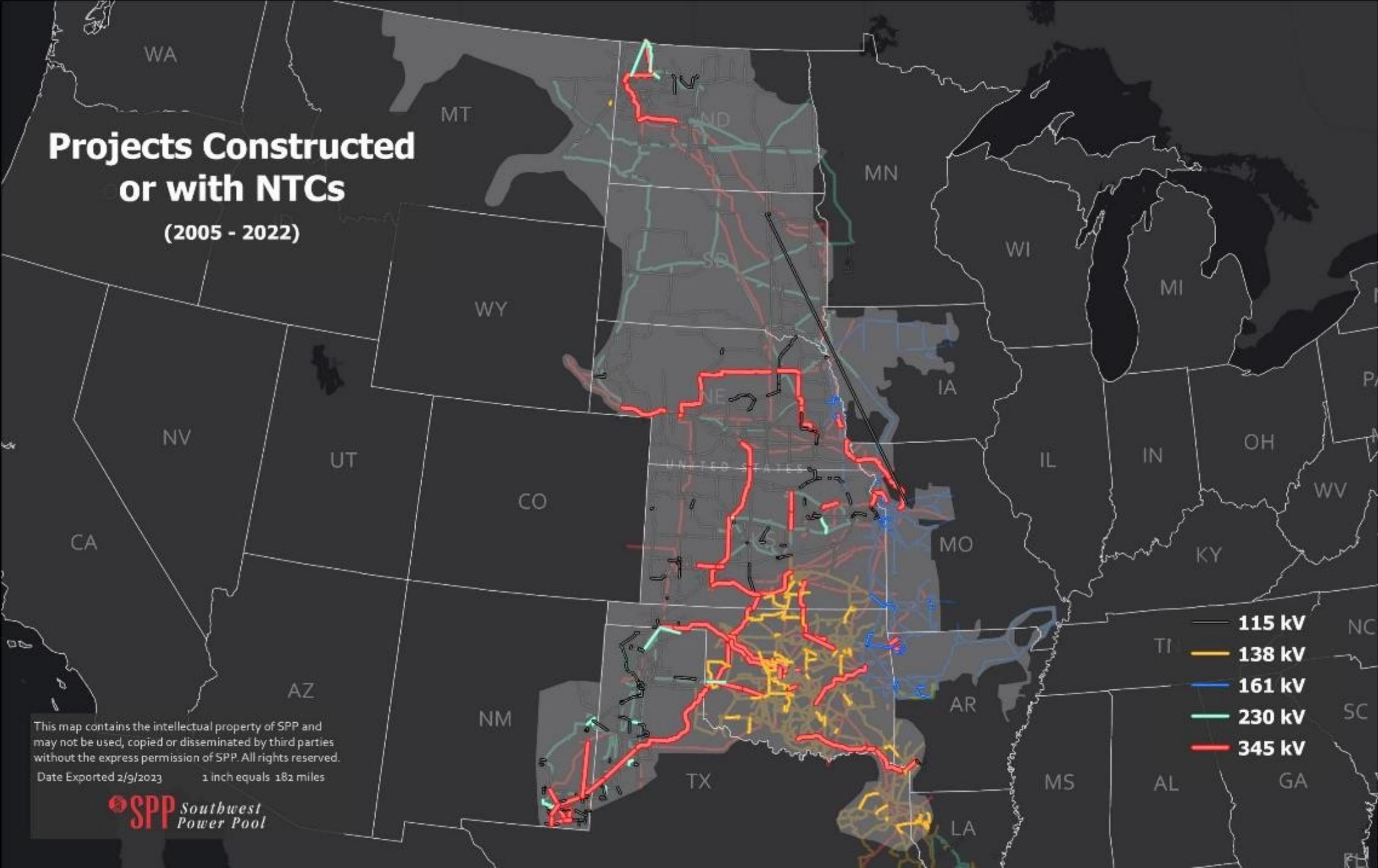
INVESTMENT BY IN-SERVICE YEAR

SPP's study processes have resulted in direction of ~\$12.3 billion in transmission investment since 2006



Projects Constructed or with NTCs

(2005 - 2022)

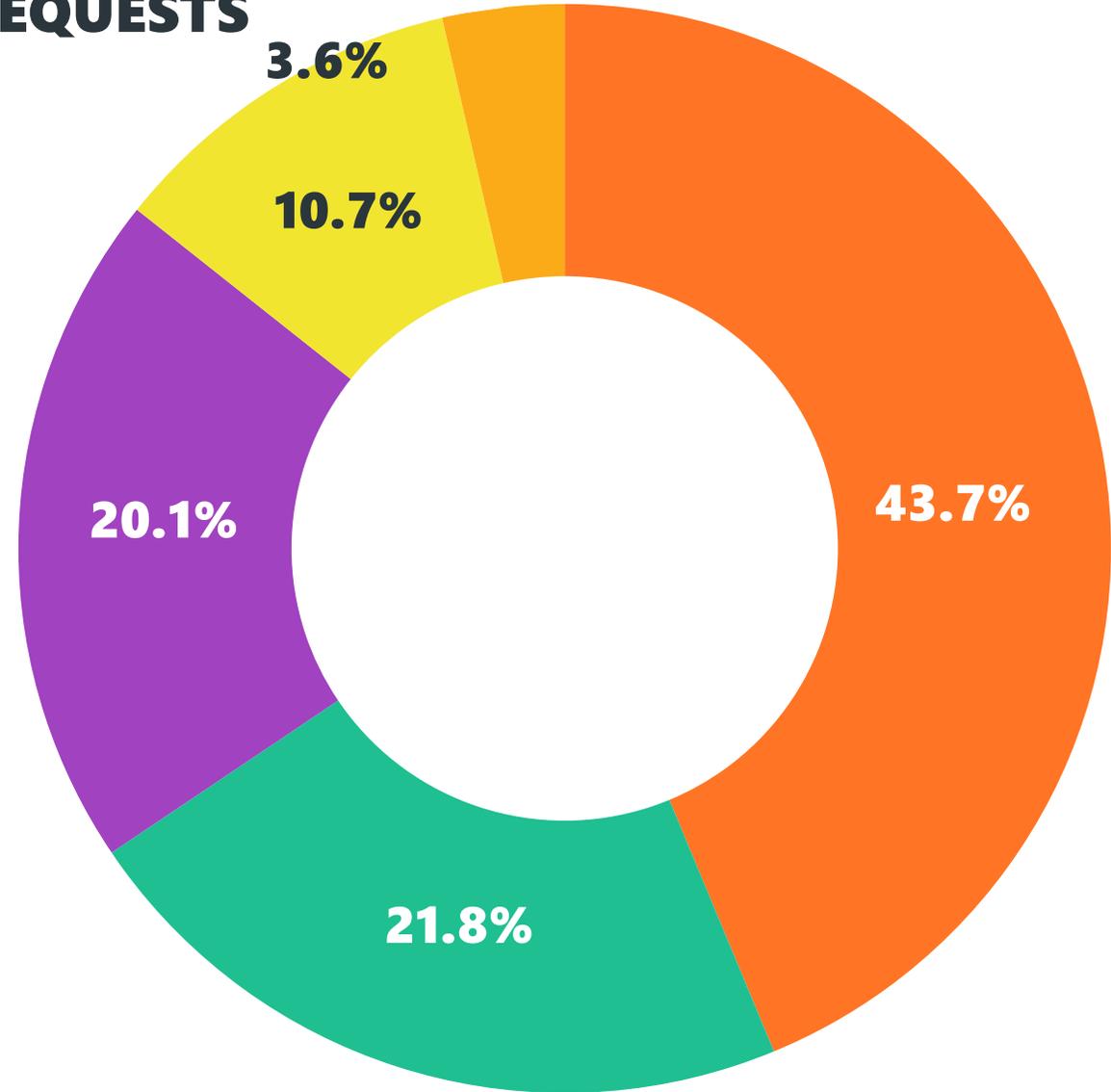


This map contains the intellectual property of SPP and may not be used, copied or disseminated by third parties without the express permission of SPP. All rights reserved.

Date Exported 2/9/2023 1 inch equals 182 miles

95.2 GW GENERATOR INTERCONNECTION REQUESTS UNDER STUDY

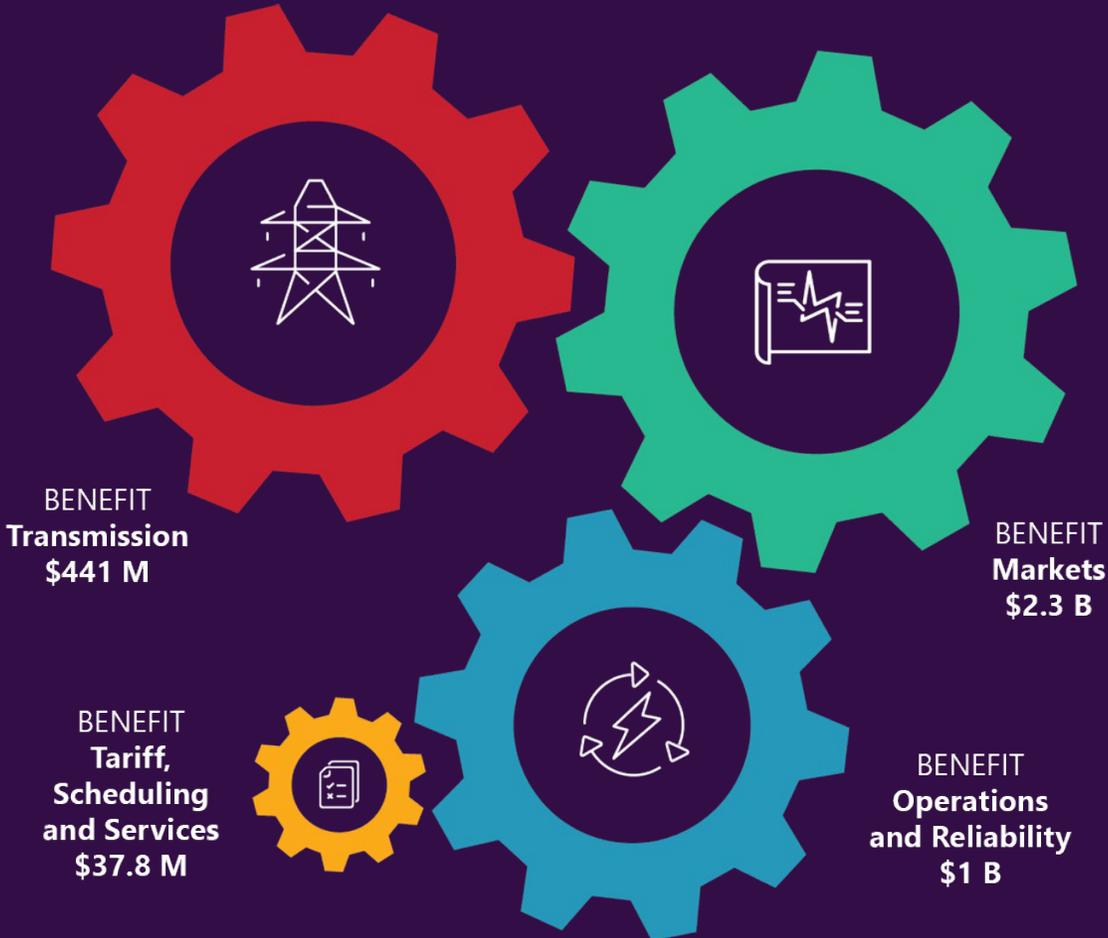
AS OF AUGUST 31, 2023



- Solar (41,620 MW)
- Wind (20,791 MW)
- Storage (19,156 MW)
- Hybrid: renewables + storage (10,165 MW)
- Gas/Thermal (3,445 MW)

\$3.787 BILLION

2022 SAVINGS AND BENEFITS



Operations and Reliability: \$1 billion

SPP operates from a regional perspective. This reduces costs and required energy reserves and increases efficiency.

Markets: \$2.3 billion

SPP's Integrated Marketplace combines efficient and economic day-ahead, real-time and transmission markets.

Transmission: \$441 million

SPP's collaborative, stakeholder-driven transmission planning processes result in robust infrastructure and have rapidly and reliably integrated renewables.

Tariff, Scheduling and Services: \$37.8 million

SPP's industry-leading services and training meet the compliance, settlements, engineering, tariff and scheduling needs of our customers on a regional scale.

**Attachment J: “SSP1013 and SSP1061 Study Synopsis”
Presented to the Oklahoma Senate Energy and
Telecommunications Committee
October 4, 2023**

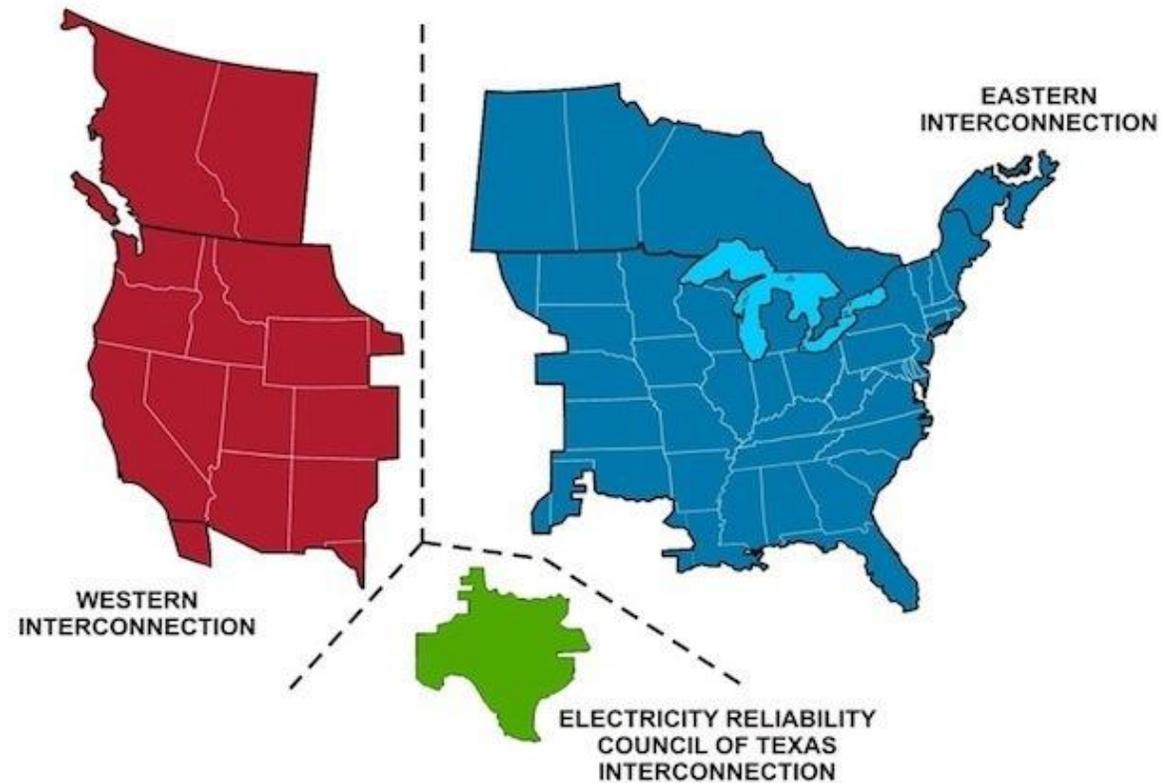
OK Senate Energy Committee

October 4, 2023

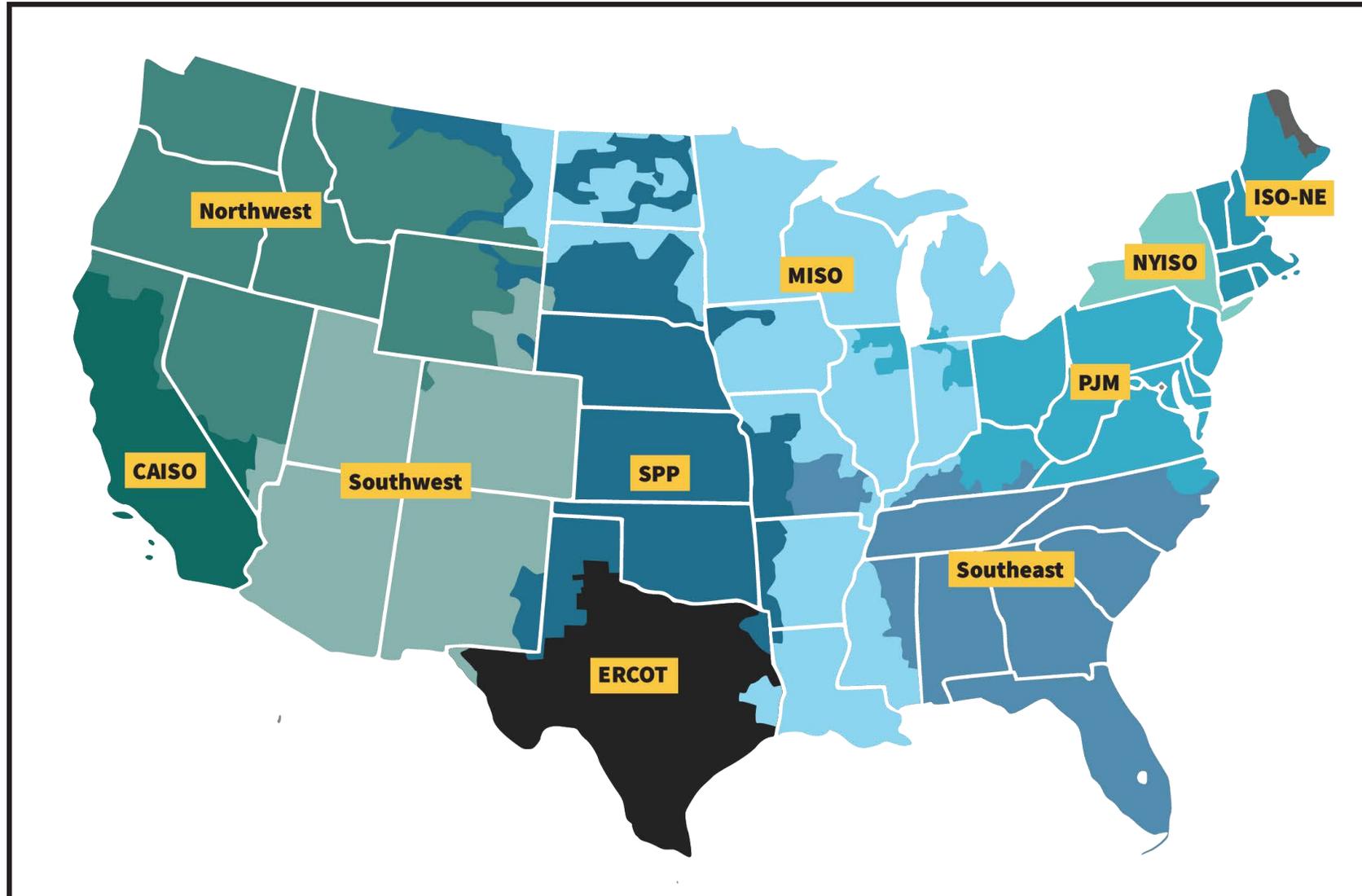


Three Asynchronous Grids in Lower 48

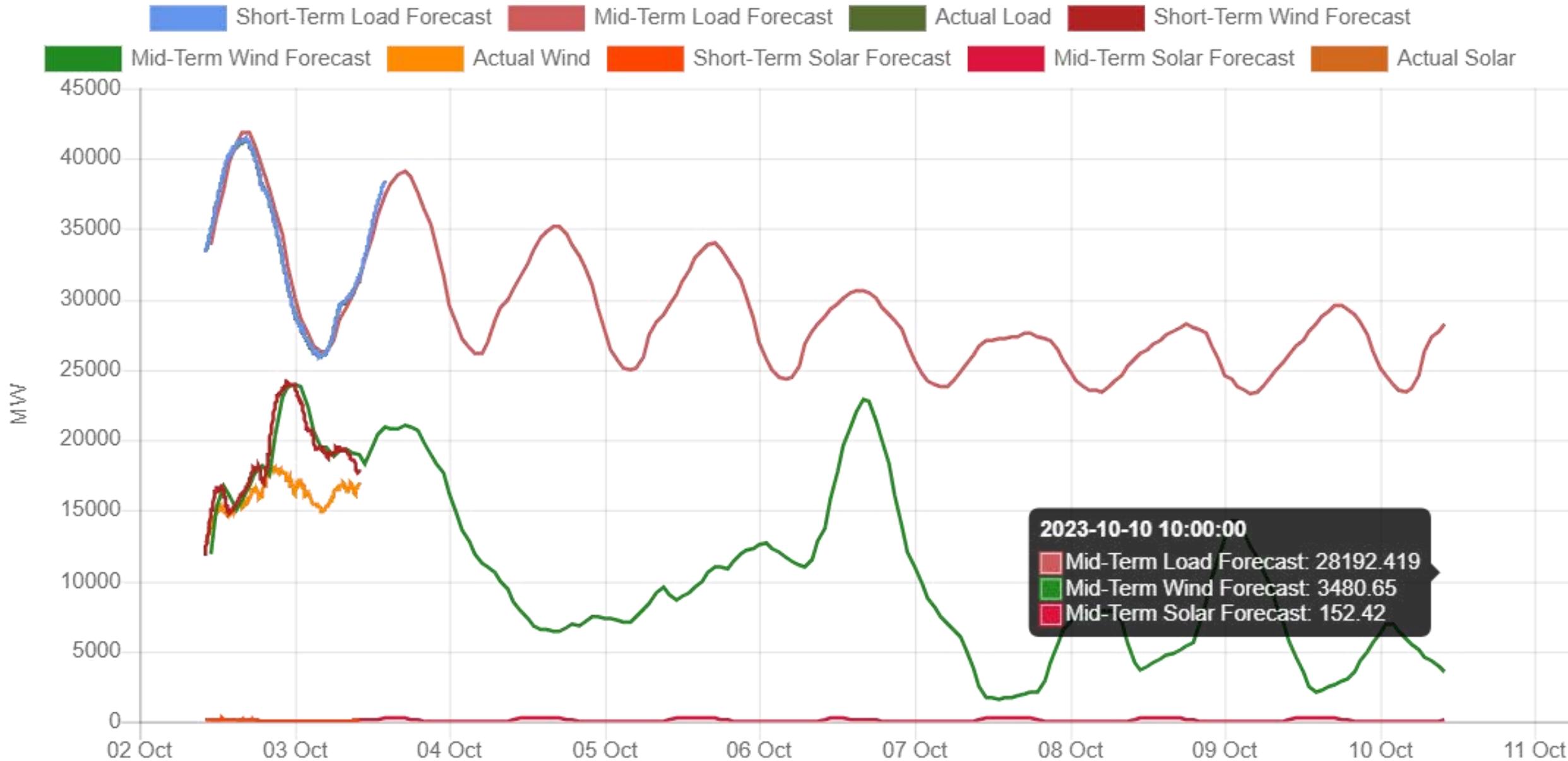
North American Electric Reliability Corporation Interconnections



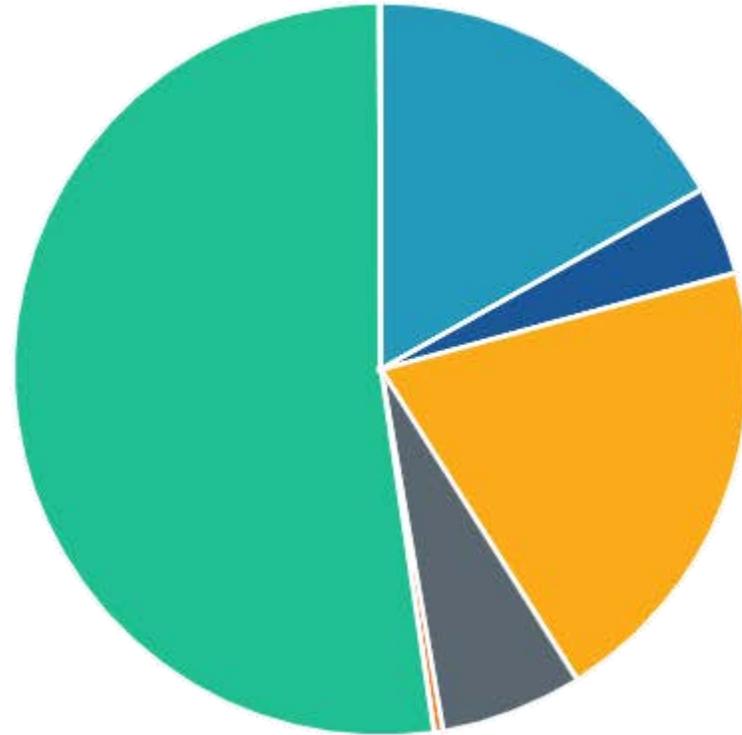
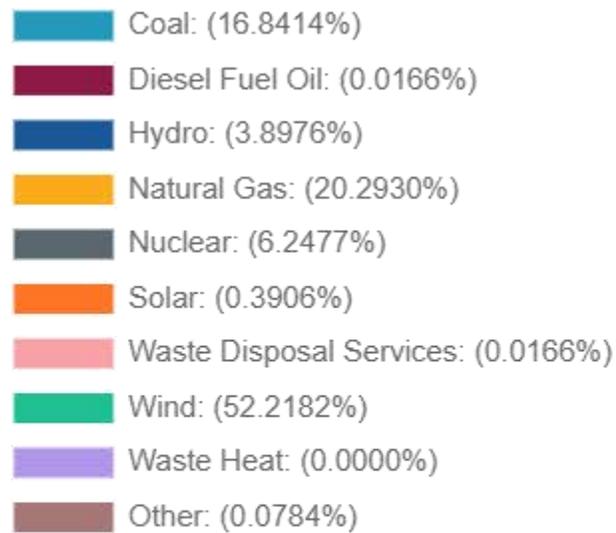
Regional Transmission Operators (RTO) Independent System Operators (ISO)



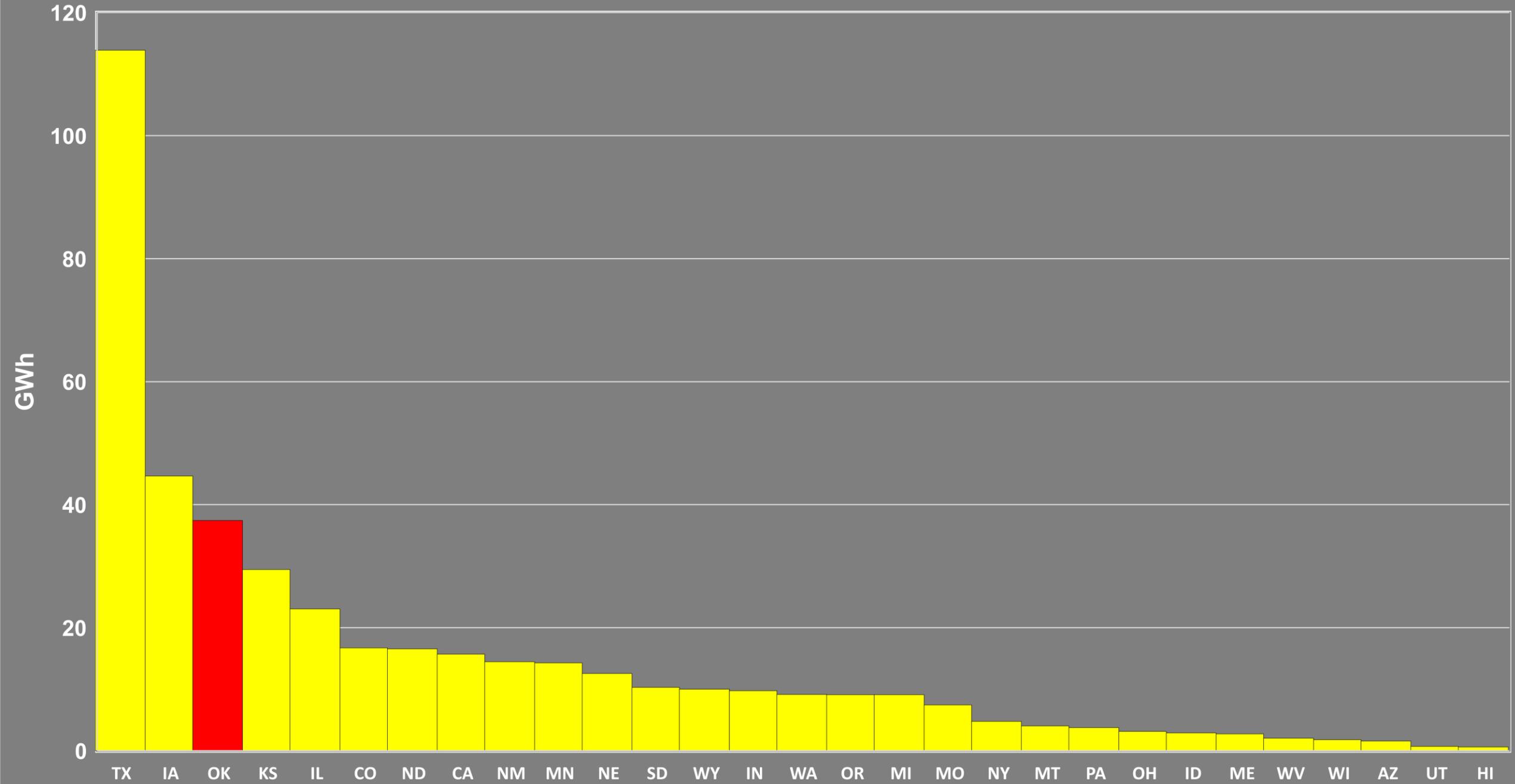
SPP 10-Day Outlook



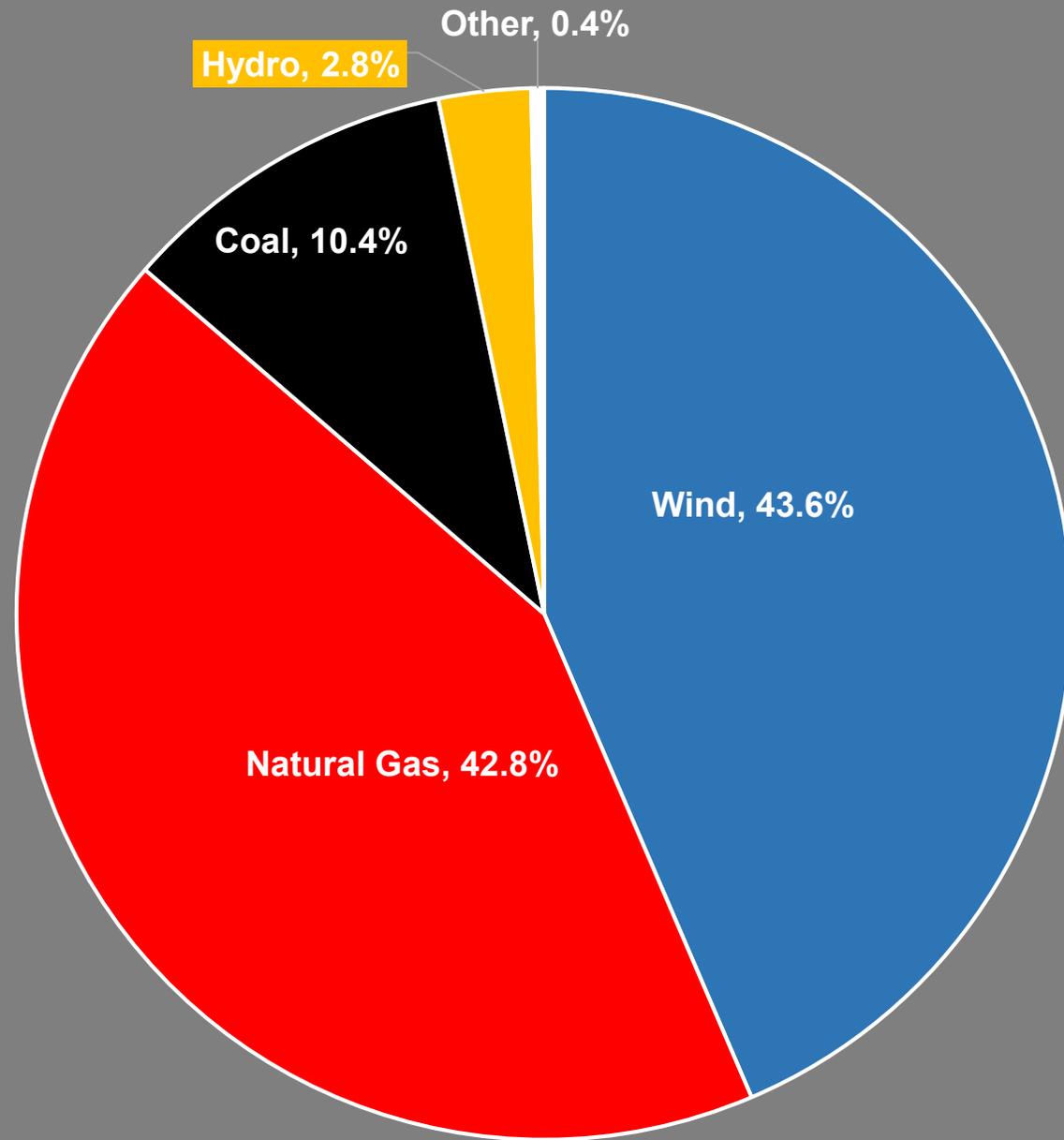
SPP Power Generation 10/2/2023 10:15 am CDT



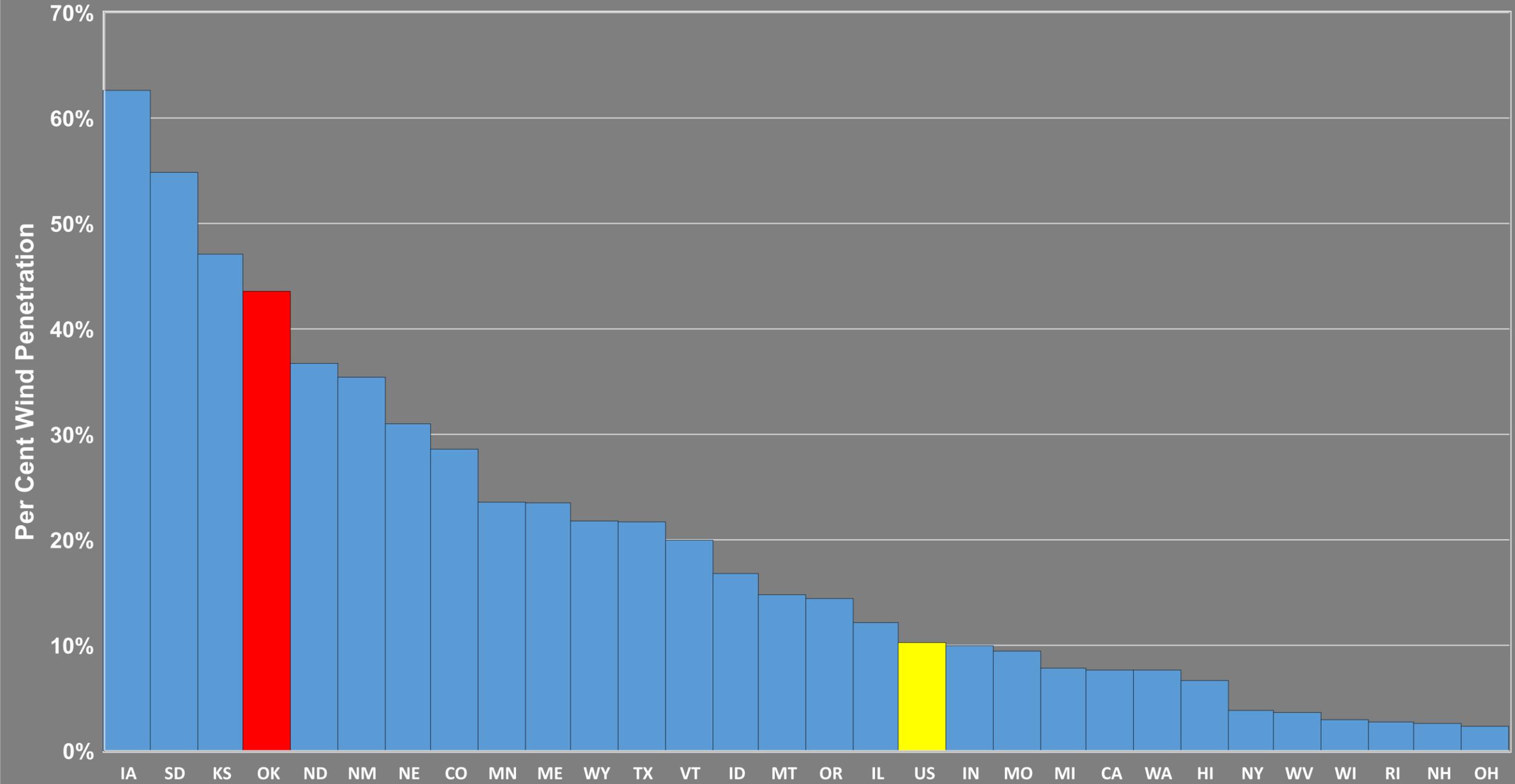
2022 Wind Generation



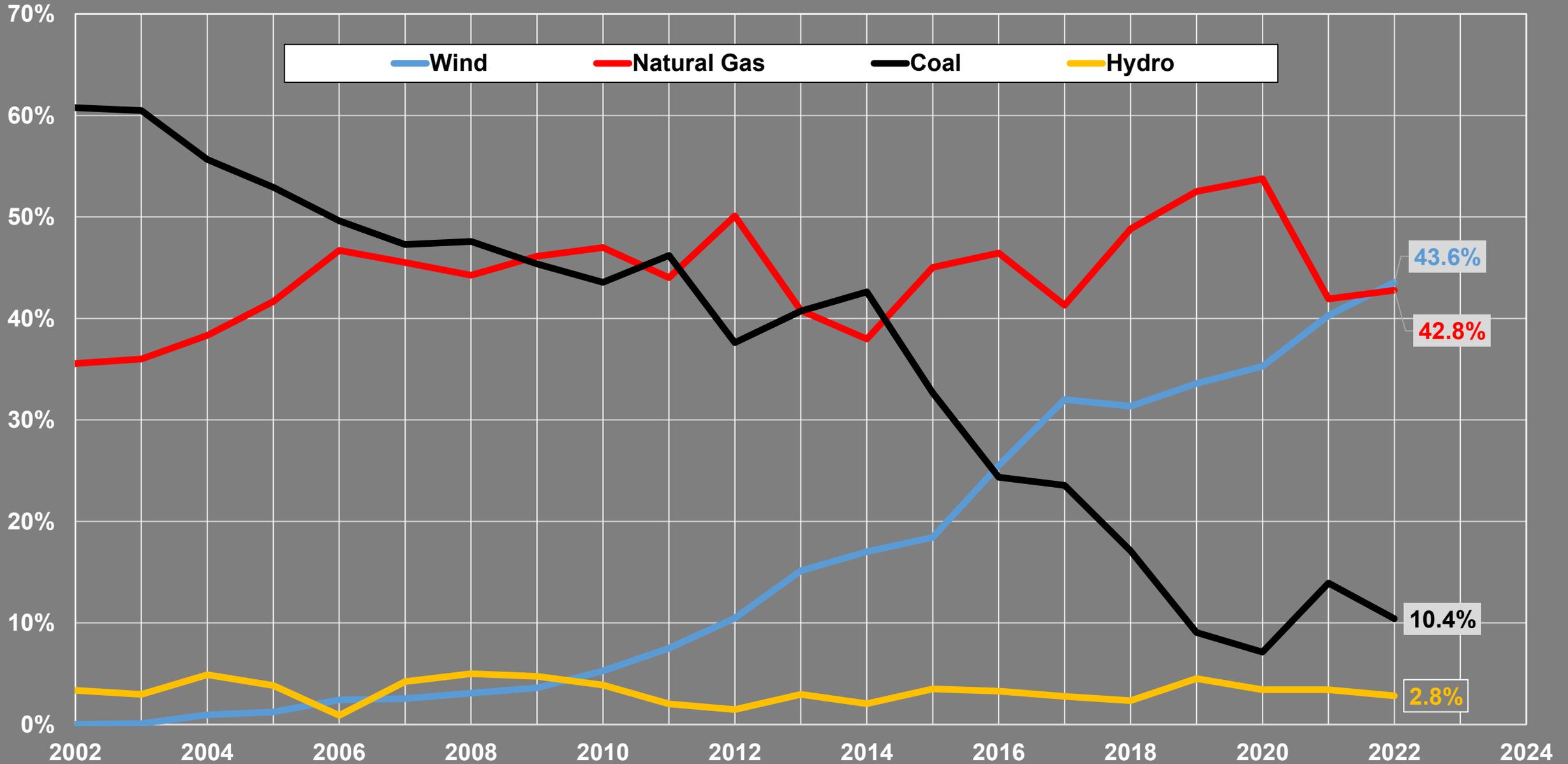
2022 OK Generation



2022 Wind Generation

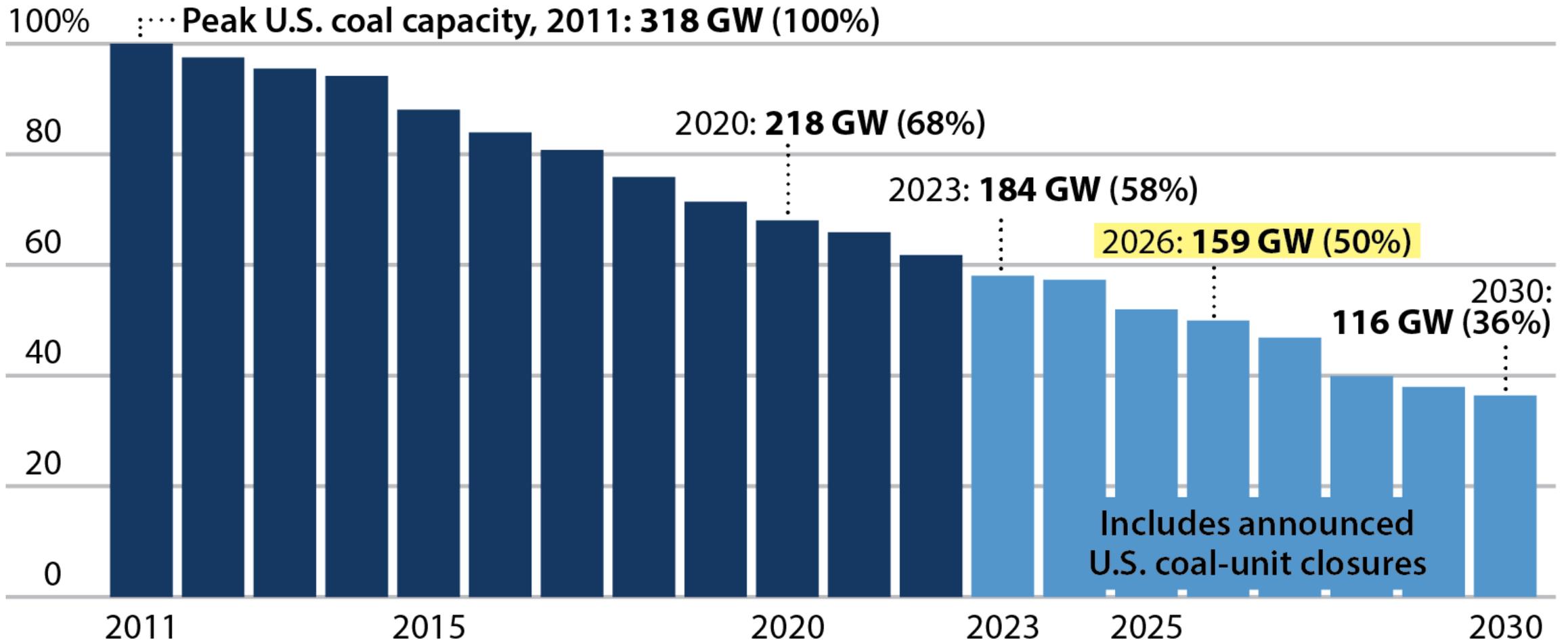


OK Electrical Generation



Half of Peak Coal-Fired Generation Capacity to Close in U.S. by 2026

The peak of coal's power generation capacity was in 2011, at 317.6 GW. Just 15 years later, in 2026, half of that capacity will be gone — replaced by gas, wind and utility-scale solar.



Sources: EIA; PJM; S&P Global; IEEFA research (2021-2030)

End of each year, as of March 7, 2023

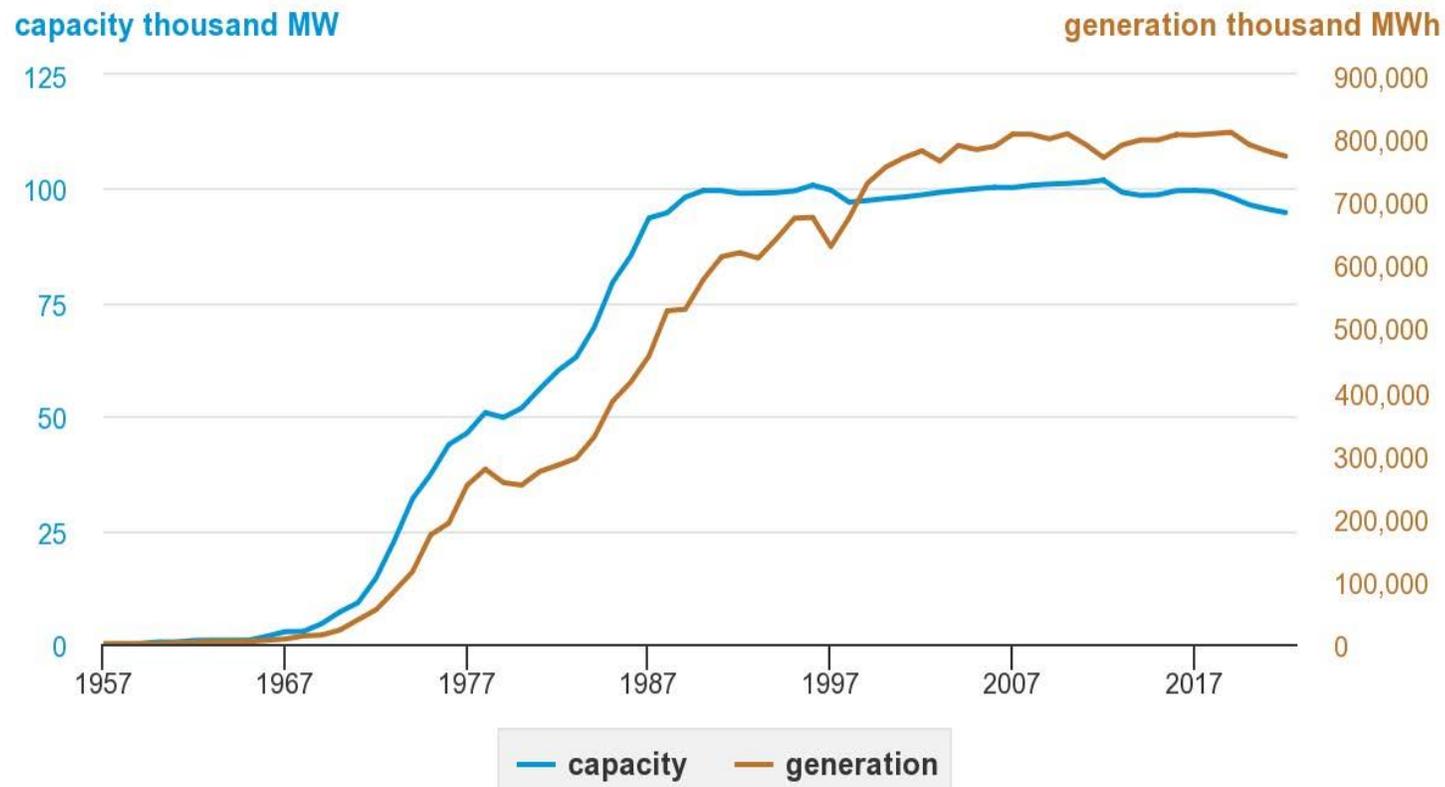
IEEFA

Oklahoma Coal-Fired Generation Stations

Name	Capacity (MW)	Year Completed
Grand River Energy Center	594	1985
Hugo Power Plant	446	1982
Muskogee Generating Station	572	1984
Northeastern Station	473	1979
River Valley Generating Station	350	1990 - Unit 1
		1990 - Unit 2
Sooner Generating Station	1,138	Unit 1 - 1979
		Unit 2 - 1980
TOTAL	3,573	

US Nuclear Domestic Power Industry

U.S. nuclear electricity generation capacity and generation, 1957-2022



- First Commercial Reactor – 1958
- Today – 93 Reactors at 54 sites
- 28 states have nuclear reactors
- Alvin V. Vogtle #3 online 2023
- Alvin V. Vogtle #4 on line 2024

Data source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 8.1, July 2023, preliminary data for 2022



Note: Capacity is net summer; MW is megawatts; MWh is megawatthours.

Advancement of Nuclear Power Technologies

Steven Biegalski, Ph.D., P.E.

sbiegalski6@gatech.edu

Outline

- What has changed to put nuclear power in demand?
- What options are available for new nuclear reactors?
- Summary

What has changed to put nuclear power in demand?

- Increased electricity demand.
- Focus on carbon-free electrical production.
- Success in operation of current nuclear reactor fleet.
- Success in building new nuclear reactors.
- Public perception.

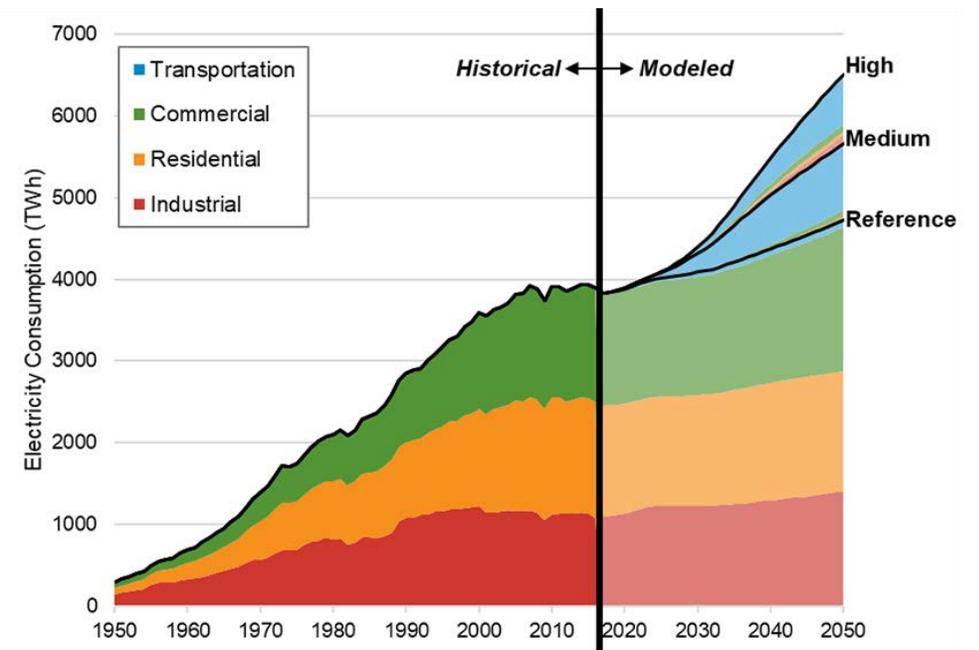


Vogtle 3 AP 1000 started operations in 2023.

Increased Electricity Demand

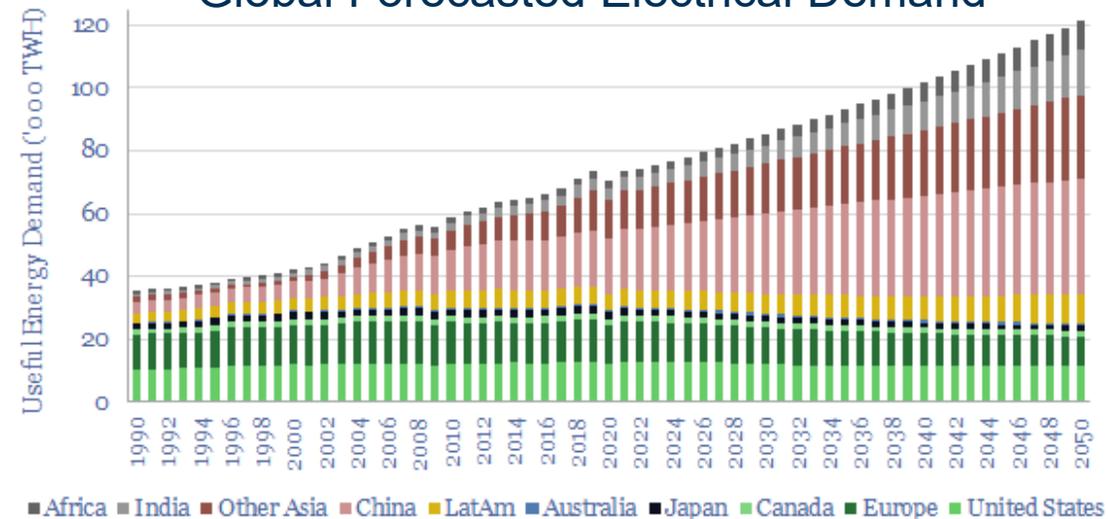
- Electrical demand is increased within the US and globally.
- Retirement of current power plants.
- Factors driving growth include:
 - Transportation transformation to utilize electric vehicles.
 - Data centers (one big new data center could require multiple dedicated nuclear reactors for electricity).
 - Industrial process heat.
 - Desalination.
 - Hydrogen production.

U.S. Forecasted Electrical Demand



<https://www.nrel.gov/news/program/2018/analysis-demand-side-electrification-futures.html>

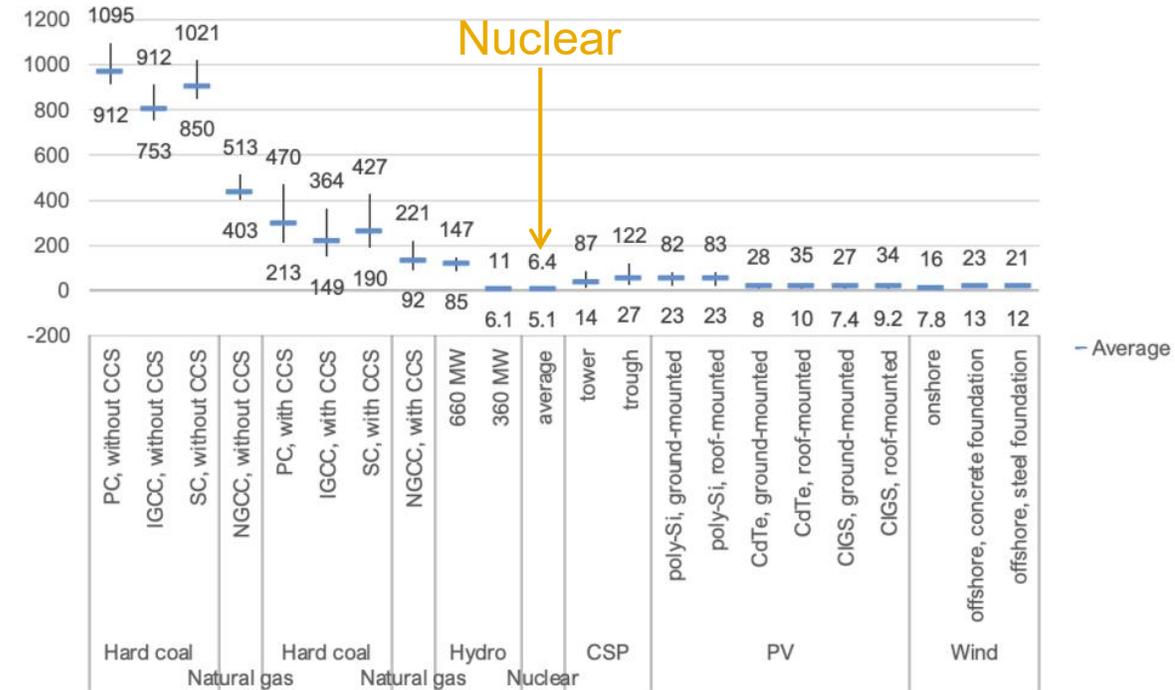
Global Forecasted Electrical Demand



<https://thundersaidenergy.com/downloads/global-energy-demand-by-region-and-through-2050/>

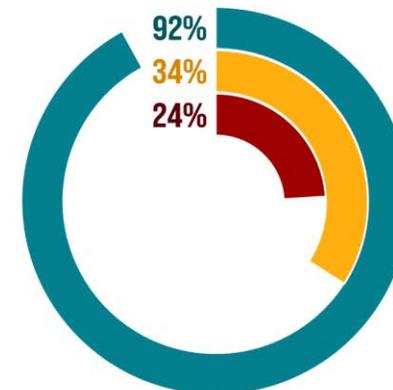
Carbon Free Electricity

- Nuclear power is “carbon-free” meaning that it does not produce CO₂ during operation.
- Currently, nuclear power produces more carbon-free electricity in the United States than any other source.
- Of the carbon-free electricity sources, nuclear power has the highest capacity factor (**this means that nuclear power is a very reliable source of electricity**).
- **Each nuclear power plant prevents the emission of over two million tons of carbon dioxide into the atmosphere annually and 100 million tons of carbon dioxide over its lifetime.**

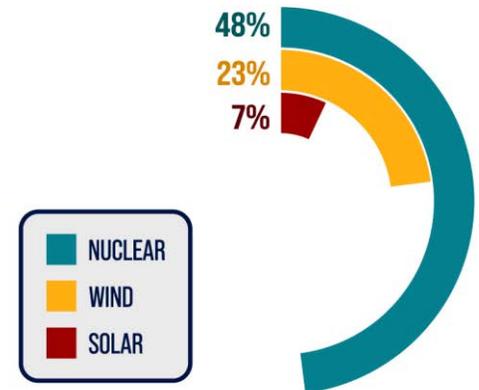


<https://world-nuclear.org/information-library/energy-and-the-environment/carbon-dioxide-emissions-from-electricity.aspx>

CAPACITY FACTORS



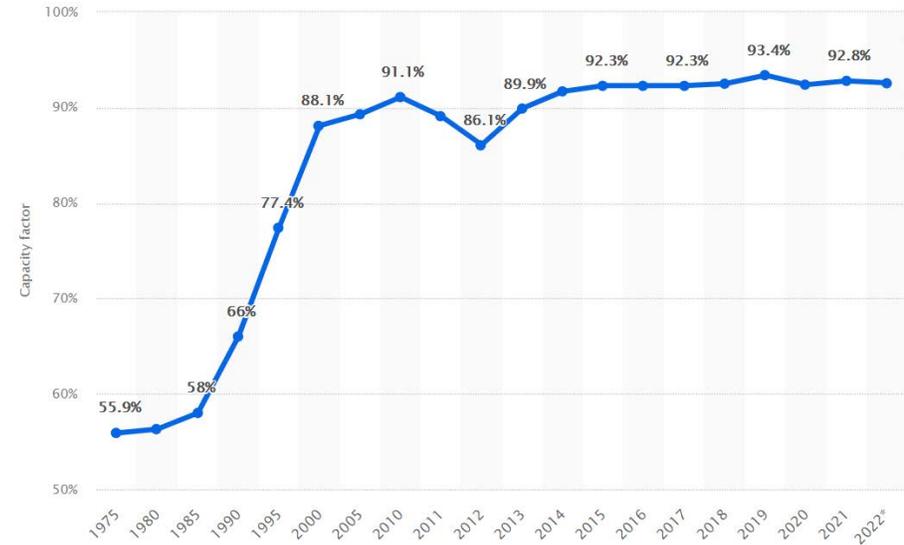
CARBON-FREE ELECTRICITY GENERATED



<https://www.rpc.senate.gov/policy-papers/democrats-try-to-pull-the-plug-on-carbon-free-nuclear-power>

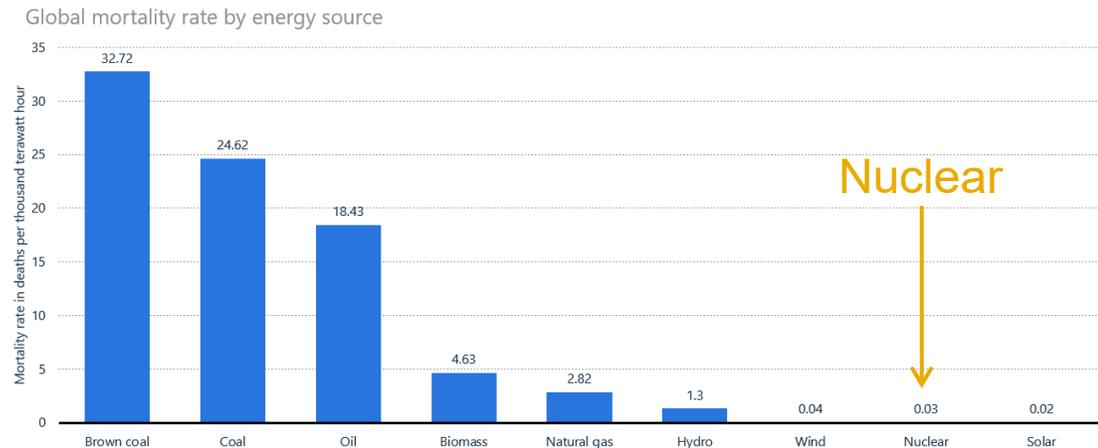
Success in Operation of Current Nuclear Reactor Fleet

- Successful operation of the US nuclear reactor fleet has significantly increased the viability of nuclear power as a source of electricity.
- Nuclear power has the highest capacity factor of any other energy source producing reliable, carbon-free power more than 92% of the time.
- Mortality rates from air pollution and air pollution show that nuclear power is one of the safest sources of electrical production.



<https://www.statista.com/statistics/191201/capacity-factor-of-nuclear-power-plants-in-the-us-since-1975/>

Mortality rate from accidents and air pollution per unit of electricity worldwide, by energy source (in deaths per thousand terawatt hour)



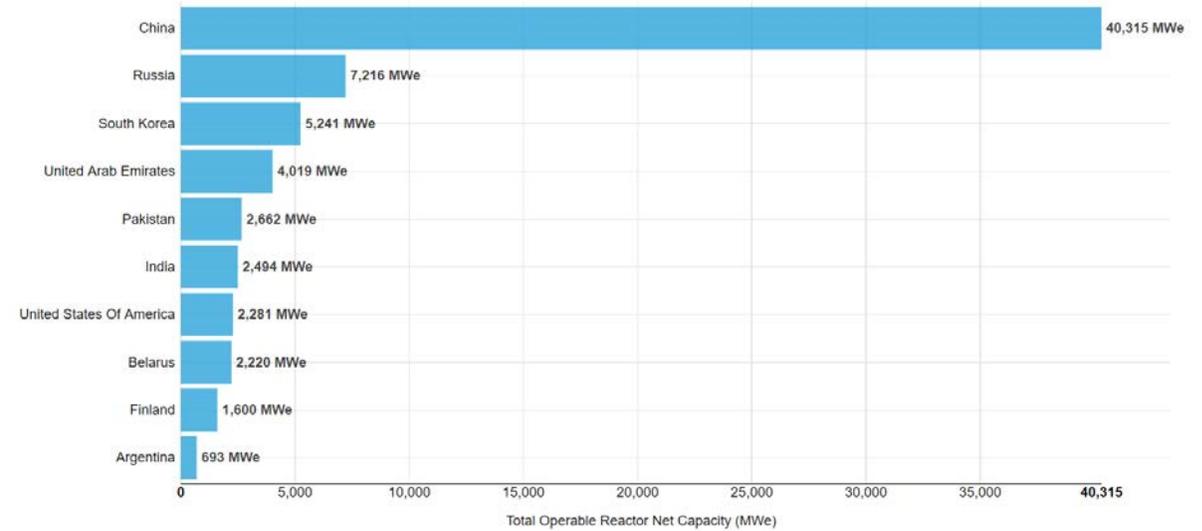
Notes: Worldwide, 2018

Further information regarding this statistic can be found on page 8.

Source(s): Canary Media; OWID; Expert(s) (Markandya & Wilkinson (2007); Sovacool et al. (2016); UNSCEAR (2008; & 2018)); ID_494425

Success in Building New Nuclear Power Plants

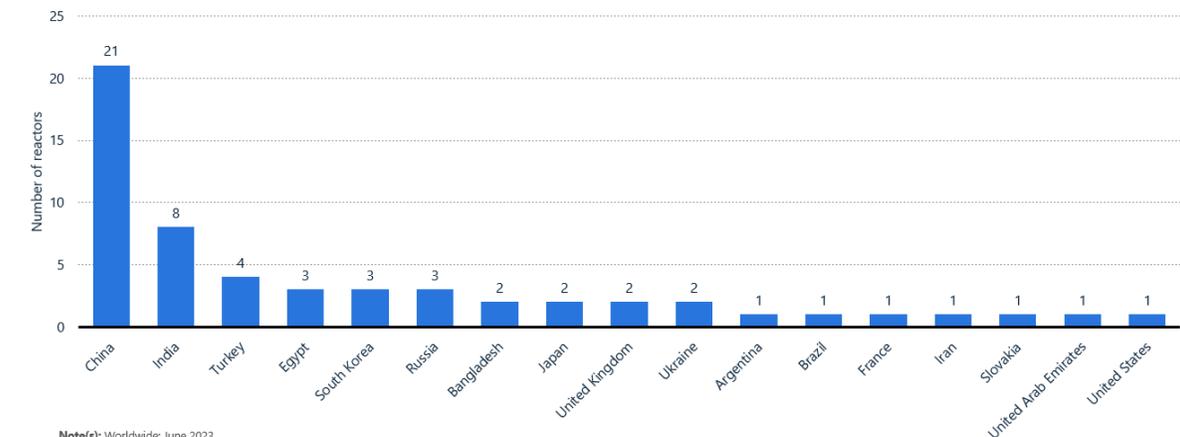
- The world has seen a significant expansion of the nuclear reactor fleet.
- 69 new nuclear power plants have been added to the world-wide grid in the last decade.
- 39 new nuclear reactors in China alone over the last decade.
- United States has two new nuclear power plant on the grid (Vogtle 3 and Watts Bar 2) in the last decade.
- 57 new nuclear power plants under construction world-wide.



<https://world-nuclear.org/information-library/facts-and-figures/reactor-database-data/>

Number of nuclear reactors under construction worldwide as of June 2023, by country

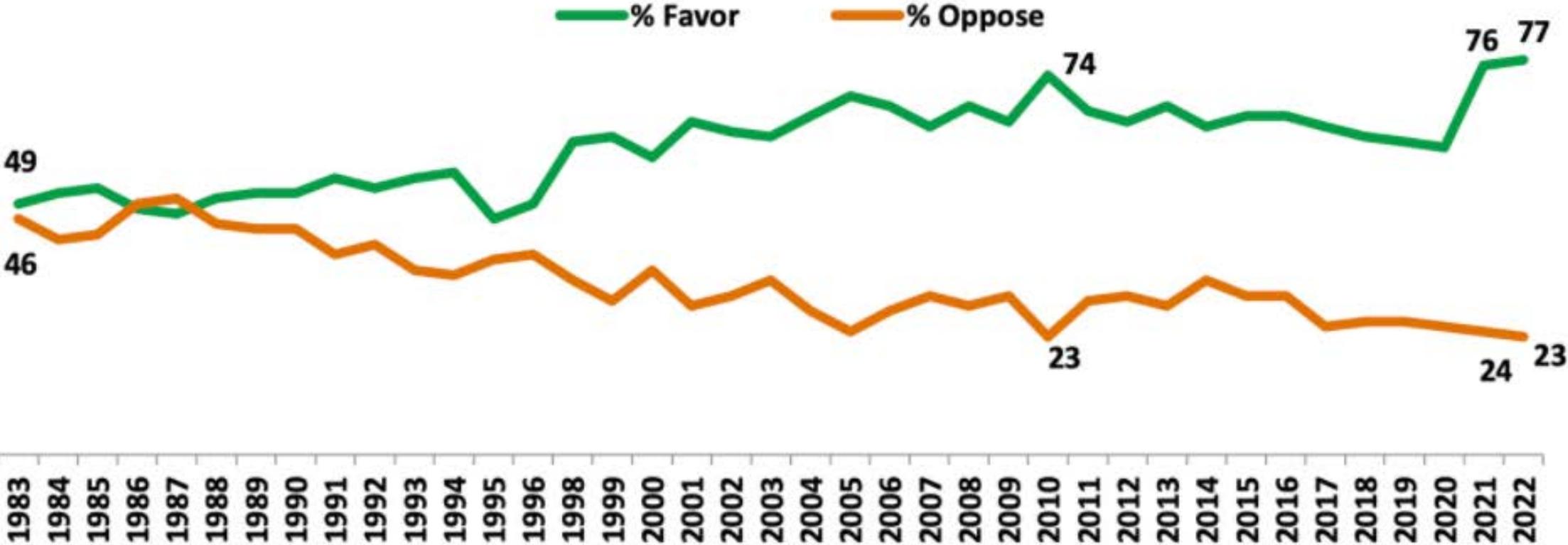
Global number of nuclear reactors under construction 2023, by country



Note(s): Worldwide; June 2023
Further information regarding this statistic can be found on page 8.
Source(s): IAEA; ID_513671

Public Perception on Nuclear Power

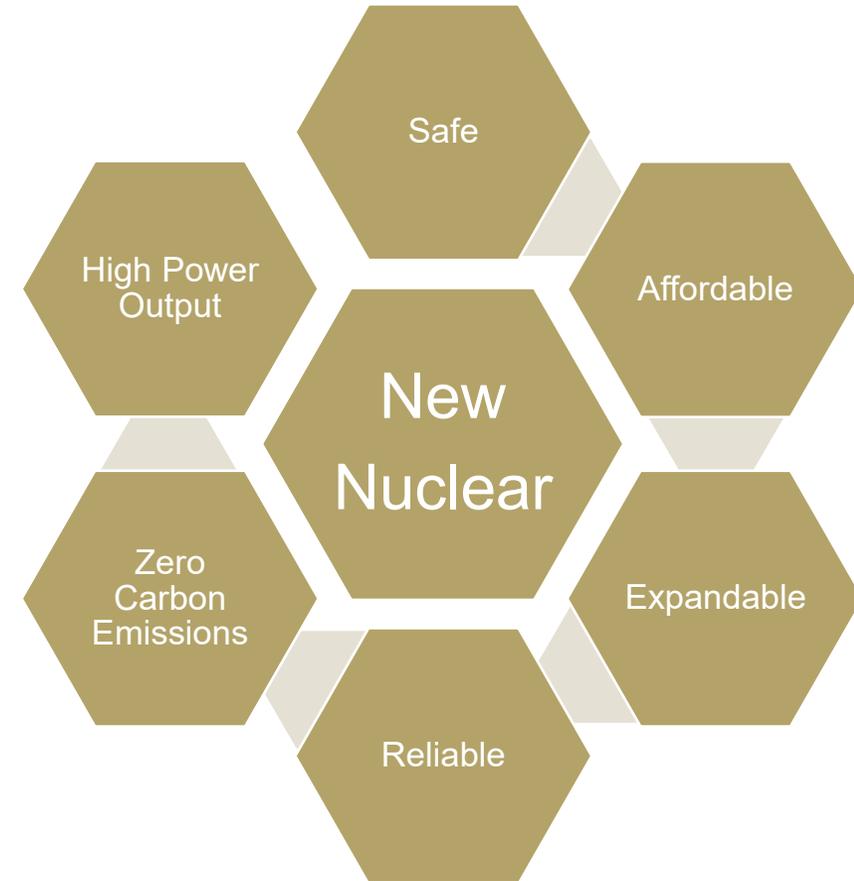
Overall, do you strongly favor, somewhat favor, somewhat oppose, or strongly oppose the use of nuclear energy as one of the ways to provide electricity in the United States? (%)



A. Bisconti, "Record High Public Support for Nuclear Energy, 2022 National Nuclear Energy Public Option Survey Finds," June 3, 2023.

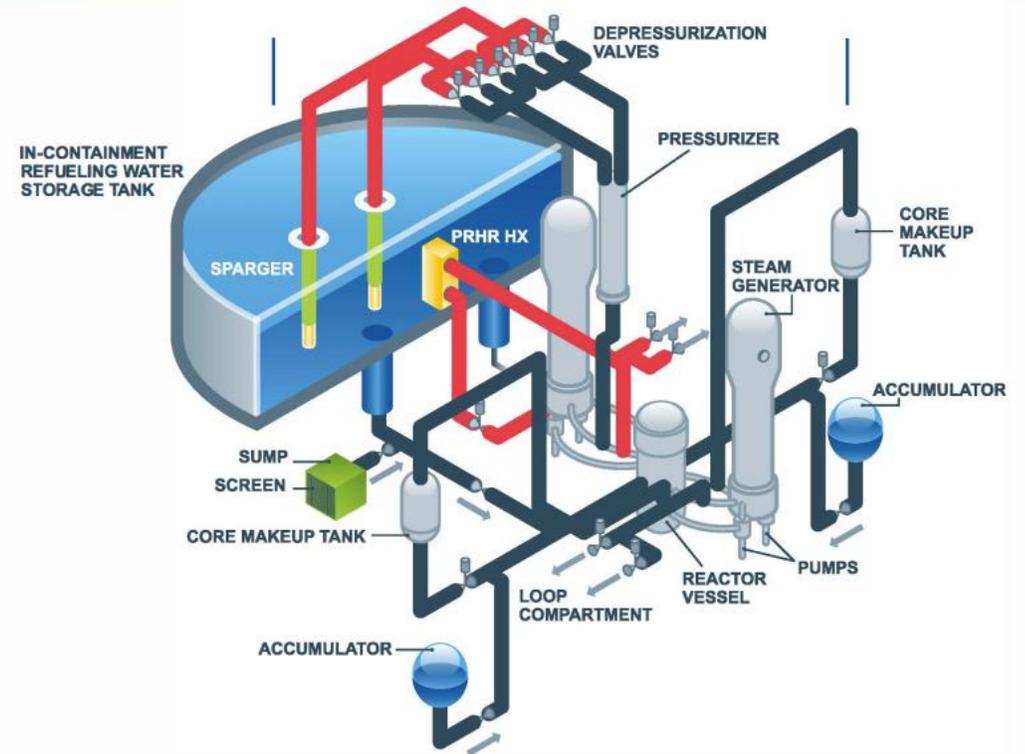
What options are available for new nuclear reactors?

- There are many new nuclear reactor designs available for consideration.
- Currently available new designs include the AP1000 design built at Vogtle 3 and 4.
- Small modular reactors (SMRs) will be available within the next five to ten years for commercial deployment.
- Advanced nuclear reactor designs will be available to start construction in the ten-to-twenty-year timeframe.
- Many new nuclear reactor designs are under development.



AP1000

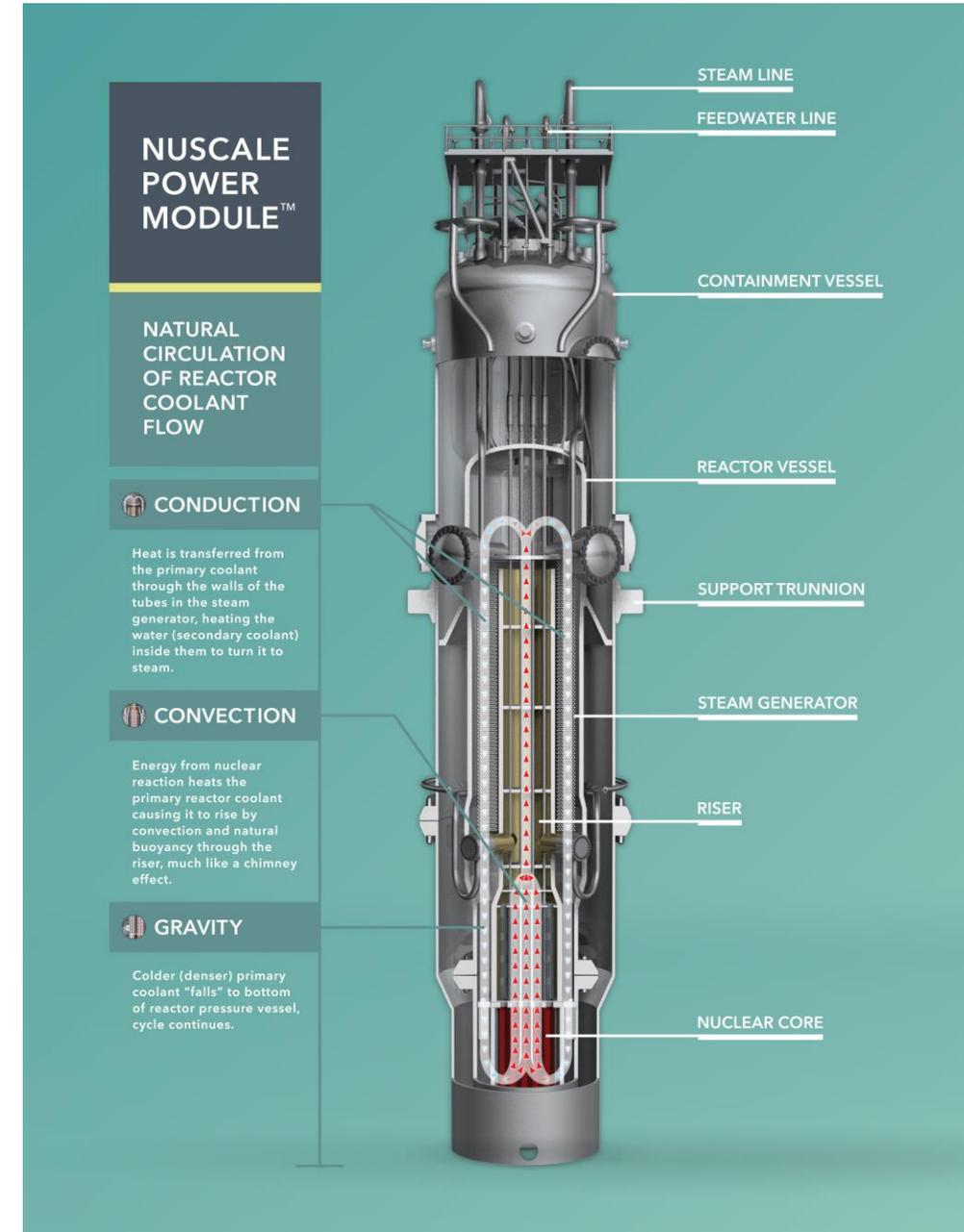
- The Westinghouse AP1000 nuclear power plant is an advanced Pressurized Water Reactor (PWR).
- The AP1000 has many advanced features including:
 - Passive safety allowing natural circulation to remove heat in a station blackout accident (e.g., Fukushima nuclear accident).
 - Increased simplicity.
 - Very low probability of core damage.
- Currently licensed in the United States.
- Success with building and operation in the United States and China.



<https://www.westinghousenuclear.com/Portals/0/New%20Plants/AP1000/AP1000%20Station%20Blackout.pdf?timestamp=1404842353431>

Small Modular Reactors (SMRs)

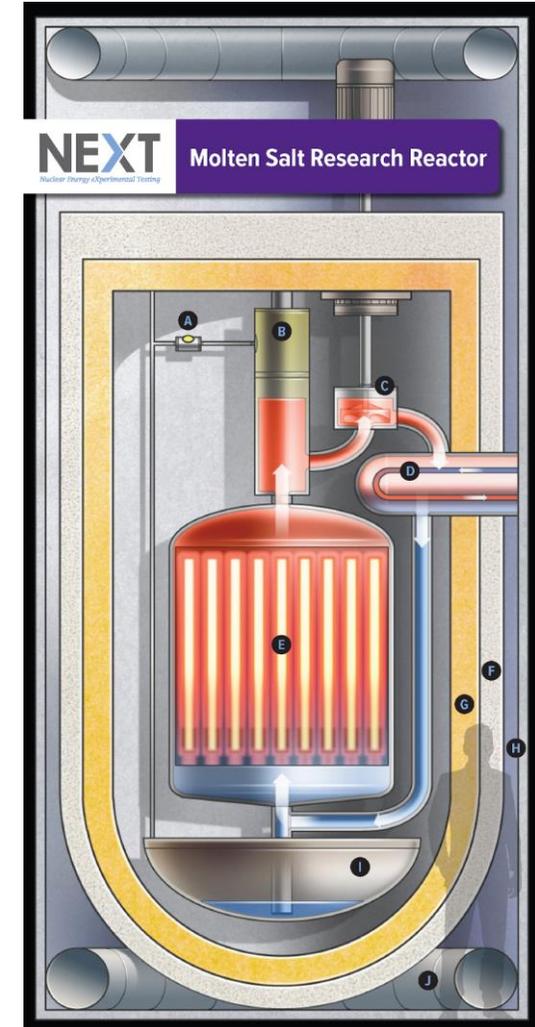
- SMRs are:
 - Smaller than most current commercial nuclear reactor designs (10% to 20% of size).
 - Modular: they can be built in factories and shipped to a site for installation. This is anticipated to improve costs and schedule for new plant construction.
 - Simpler than current commercial reactors.
 - Safer than current commercial reactors.
- Many SMR designs are under development.
- No SMRs have been built yet.
- In August of 2020, the U.S. Nuclear Regulatory Commission (NRC) approved a design for an SMR from NuScale Power, LLC.



Advanced Nuclear Reactors

- Many advanced nuclear reactor designs are under development.
- Two Molten Salt Reactor (MSR) projects have submitted licensing applications to the NRC:
 - Abilene Christian University (ACU) submitted a research reactor construction permit application for a Natura Resources, LLC design.
 - Kairos Power, LLC has submitted construction permits for two test reactors.
- Research and test reactors should be built within the next five years.
- Commercial advanced nuclear reactor designs are optimistically anticipated in ten years.

Natura Resources, LLC MSR Design



<https://naturaresources.org/>

Summary

- The Black Fox Nuclear Power Plant was proposed by the Public Service Company of Oklahoma (PSO) but was cancelled in 1982.
- Many factors support the use of nuclear power in Oklahoma:
 - Increased demand for electricity.
 - Desire to lower CO₂ emissions.
 - History of reliable nuclear power plant operations.
 - History of safe nuclear power plant operations.
 - Success in building new nuclear power plants.
 - Positive public opinion.
 - New nuclear power plant designs with increased safety.
- Oklahoma should take these new developments into account and move towards including nuclear power as part of its electrical infrastructure.

Advanced Nuclear Energy

Oklahoma Senate and House
Interim Study

October 4, 2023

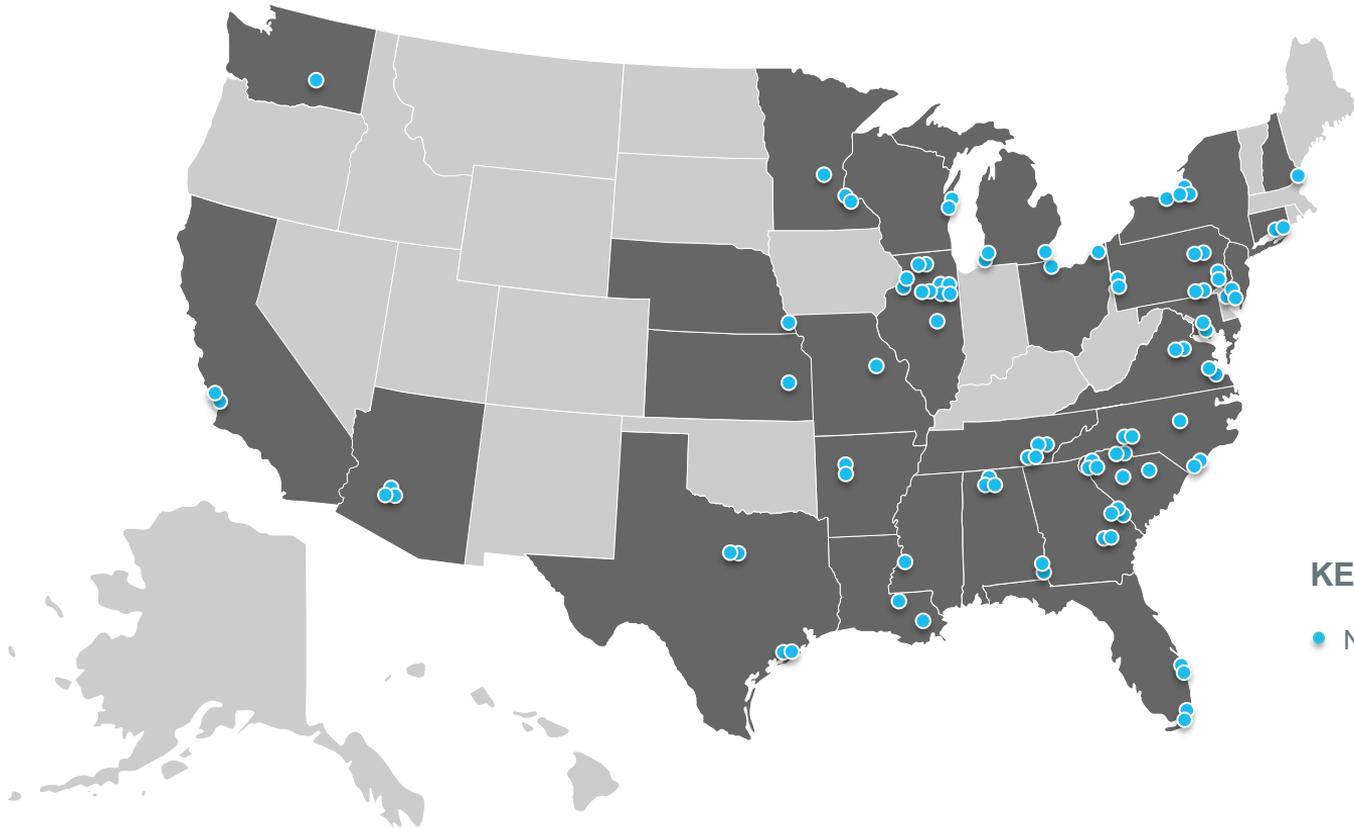


Marc Nichol
Executive Director, New Nuclear

©2022 Nuclear Energy Institute



Nuclear Provides Majority of Emissions-Free Electricity



Nuclear generated 19% of electricity in the U.S.

From 93 reactors at 53 plant sites across the country

KEY

● Nuclear power reactor

Expanding Versatility through Advanced Technology



Micro Reactors
($< 20\text{MW}$)



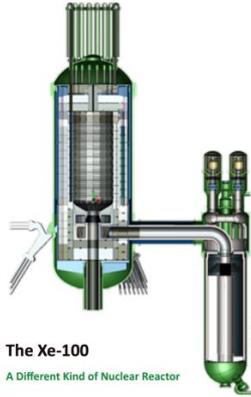
Oklo (shown)
Approximately a dozen in
development

LWR SMRs
 $< 300\text{MW}$



NuScale (shown)
GEH X-300
Holtec SMR-160

High Temp
Gas Reactors



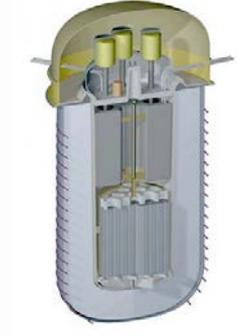
X-energy (shown)
Several in development

Liquid Metal Reactors



TerraPower Sodium (shown)
Several in development

Molten Salt Reactors



Terrestrial (shown)
Several in development

Non-Water Cooled

Most $< 300\text{MW}$, some as large as $1,000\text{ MW}$

System Benefits of Advanced Reactors

Long term price stability

- Low fuel and operating costs

Reliable dispatchable generation

- 24/7, 365 days per year, years between refueling (Capacity factors >92%)

Integration with renewables and storage

- Paired with heat storage and able to quickly change power

Efficient use of transmission

- Land utilization <0.1 acre/TWh (Wind =1,125 acre/TWh; Solar 144 acre/TWh)

Environmentally friendly

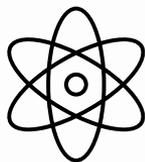
- Zero-carbon emissions, one of lowest total carbon footprints
- Many SMRs are being designed with ability for dry air cooling

Black-start and operate independent from the grid

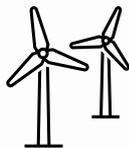
- Resilience for mission critical activities
- Protect against natural phenomena, cyber threats and EMP

Lowest System Cost Achieved by Enabling Large Scale New Nuclear Deployment

Lowest Cost System

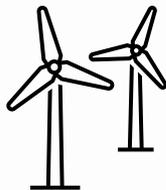


Nuclear is 43% of generation (>300 GW of new nuclear)

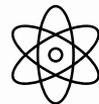


Wind and solar are 50%

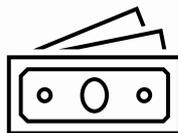
Energy System with Nuclear Constrained



Wind and Solar are 77% of generation



Nuclear is 13% (>60 GW of new nuclear)



Increased cost to customers of \$449 Billion

Both scenarios are successful in reducing electricity grid GHG emissions by over 95% by 2050 and reducing the economy-wide GHG emissions by over 60%

Strong Federal Support for Advanced Reactors

- DOE funding 12 different designs, >\$5B over 7 years
- Infrastructure Bill
 - \$2.5B funding for two demonstration projects
- Inflation Reduction Act
 - PTC: At least \$30/MWh for 10 years
 - ITC: 30% of investment
 - Both can be monetized, include 10% bonus for siting in certain energy communities
 - Loan Guarantees – up to \$40B in expanded authority
 - HALEU Fuel - \$700M
- CHIPS Act
 - Financial assistance to States, Tribes, local governments and Universities

September 2022

Current Federal Policy Tools to Support New Nuclear

The following is a list of current policy tools that could directly support the deployment of new nuclear, could potentially indirectly support the deployment or planning for new nuclear, and that currently support the deployment of new nuclear.

Programs that Could Directly Support Deployment of New Nuclear

Clean Electricity Production Credit – 45V

The Inflation Reduction Act created a new technology-neutral tax credit for all clean electricity technologies, including advanced nuclear and power uprates that are placed into service in 2023 or after. The bill does not change the existing Advanced Nuclear Production Tax Credit but precludes credits from being claimed under both programs. The value of the credit will be at least \$30 per megawatt-hour, depending on inflation, for the first ten years of plant operation. The credit phases out when carbon emissions from electricity production are 75 percent below the 2022 level. The following is a link to the statutory language.

<https://uscode.house.gov/view.xhtml?req=granuleid@USC-prelim-title26-section45V&granuleid=USC-prelim-title26-section45V>

Clean Electricity Investment Credit – 48E

As an alternative to the clean electricity PTC, the Inflation Reduction Act provided the option of claiming a clean electricity investment credit for zero-emissions facilities that is placed into service in 2023 or thereafter. This provides a credit of 30 percent of the investment in a new zero-carbon electricity facility, including nuclear plants. Like the other credits, this investment tax credit can be monetized. The ITC phases out under the same provisions as the clean electricity PTC.

<https://uscode.house.gov/view.xhtml?req=granuleid@USC-prelim-title26-section48E&granuleid=USC-prelim-title26-section48E>

Both the clean electricity PTC and ITC include a 10-percentage point bonus for facilities sited in certain energy communities such as those that have hosted coal plants. The following is a link to the statutory language.

Credit for Production from Advanced Nuclear Power Facilities – 45I

The nuclear production tax credit 26 USC 45I provides a credit of 1.8 cents per kilowatt-hour up to a maximum of \$125 million per tax year for 8 years. Only the first 6000 MW of new capacity installed after 2005 for a design approved after 1998 are eligible for the tax credit. The credit does not include a direct pay provision, so the owner will need to have offsetting taxable income to claim the credit or transfer the credit to an eligible project partner. The following is a link to the statutory language.

<https://uscode.house.gov/view.xhtml?req=granuleid@USC-prelim-title26-section45I&granuleid=USC-prelim-title26-section45I>

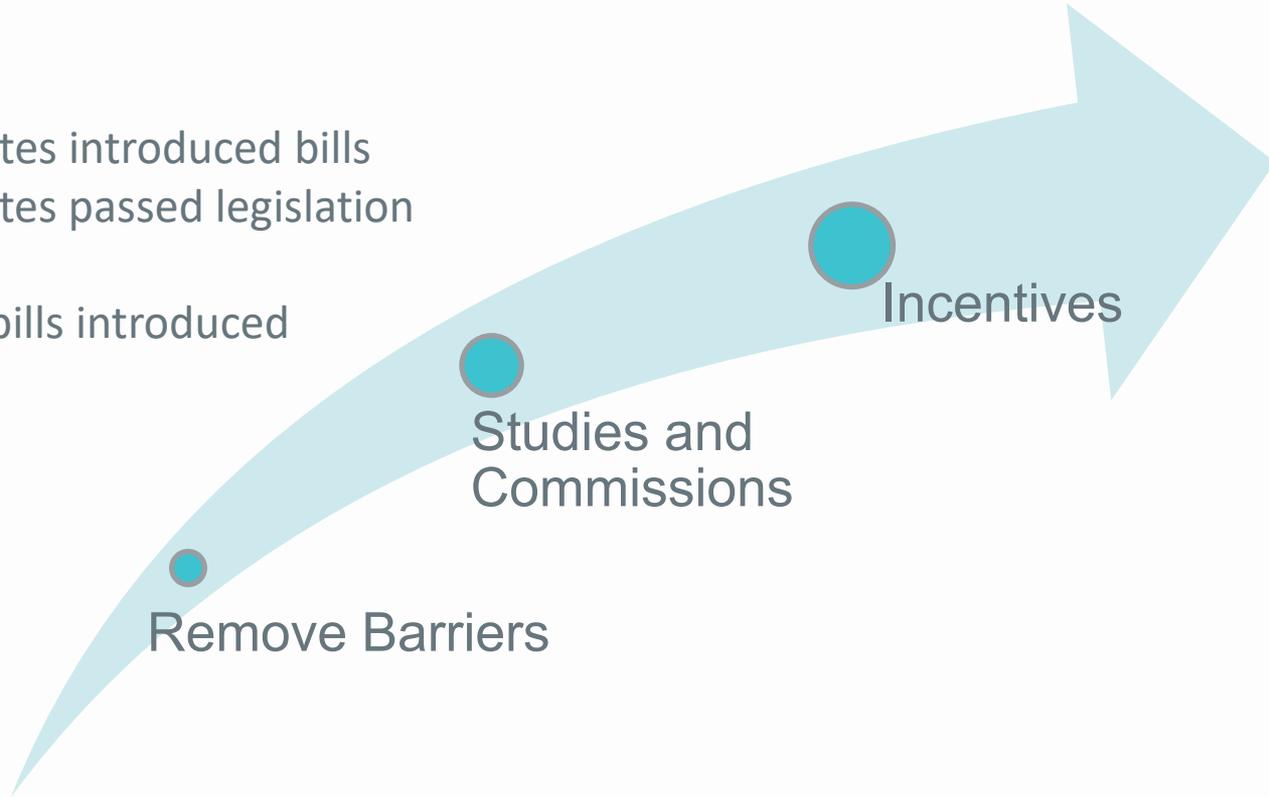
State Action for Advance Reactors

2022

- 19 States introduced bills
- 11 States passed legislation

2023

- 200+ bills introduced



Remove Barriers

Studies and
Commissions

Incentives

2023 State Actions for Nuclear Energy

CES and Defining Clean

Minnesota, Idaho, Tennessee,
North Carolina

Workforce Development

Virginia, West Virginia

SMR Incentive

Indiana

SMR Study

North and South Dakotas

Moratorium Repeal

Illinois

Energy Study

Colorado

Hydrogen/Nuclear

Nebraska

Nuclear Working Group or Authority

Kentucky, Connecticut, Ohio

Coal to Nuclear

Texas

Fuel Recycling

Arkansas

Interim SMR Study

Oklahoma, West Virginia

Nuclear Energy Caucus

Washington, Texas,
Michigan

2023 Governor Actions

- Tennessee's Governor Lee's **\$50 Million** for Incentives and Nuclear Energy Advisory Council
- Michigan's Governor Whitmer **\$150 Million** for re-activating Palisades in state budget
- Governor Abbott directing the PUCT to create a working group to develop rules for advanced nuclear

Advanced Reactor Licensing Progress

Approved

1. NuScale Power

Under Review

1. Abilene Christian University
2. Kairos Power
3. NuScale (power uprate)

Pre-Application

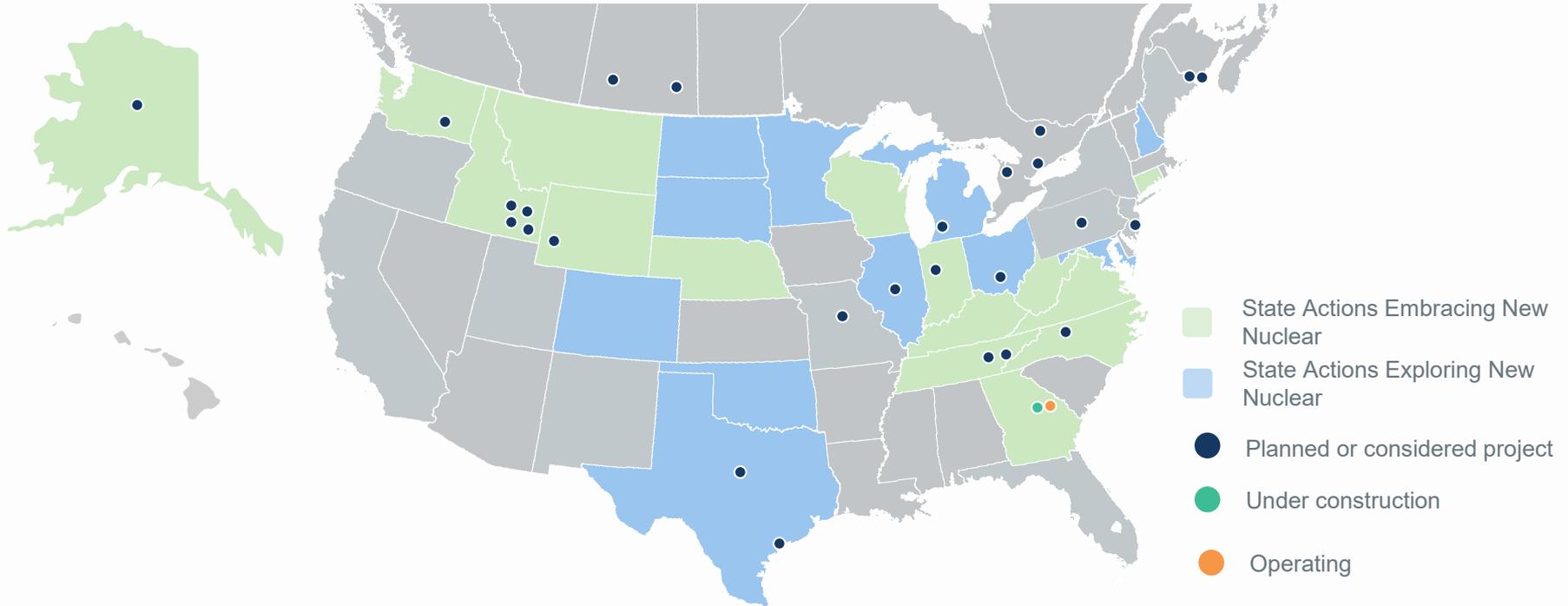
1. GEH BWR X-300
2. General Atomics
3. Holtec SMR-160
4. Kairos Power
5. Oklo
6. TerraPower Sodium
7. TerraPower MCFR
8. Terrestrial
9. Univ. of Illinois U-C
10. X-energy
11. Westinghouse

Regulatory Enhancements

- Streamlining of regulatory processes
 - Review efficiency and timeliness
 - Application review experience
 - Technology Inclusive Content of Application
- Resolution of key generic technical or policy topics
 - Emergency Planning Zone
 - Physical Security
 - Siting
- Modernize the regulations
 - Generic Environmental Impact Statement
 - Part 50/52 lessons learned
 - Part 53

Advanced Nuclear Deployment Plans

Projects in planning or under consideration in U.S. and Canada >20; Globally >30



QUESTIONS?



PSO Input for Oklahoma Nuclear Power Plant Interim Study

October 4th, 2023

Potential Study Activities

1. High level overview of advanced nuclear reactors
 - a. benefits (clean, reliable, energy & capacity, ancillary services)
 - b. costs
 - c. schedule
 - d. other benefits that may be gained by coordinating with other advanced, clean energy technologies such as hydrogen, direct air capture of carbon dioxide, and energy storage

2. High level siting study based on EPRI Nuclear siting guide
 - a. ID Region of interest
 - i. Region or State?
 - ii. w/in certain utilities service territory?
 - iii. w/ in XX miles of existing fossil units or owned assets?
 - iv. w/ in XX miles of high voltage transmission lines?
 - b. Screen Candidate Areas
 - i. Proximity to high voltage transmission lines/substations
 - ii. Water supply access
 - iii. Environmental considerations (flood plains, wetlands, scenic rivers, critical habitats, etc...)
 - iv. Proximity to sensitive populations (hospitals, schools, etc..)
 - v. Proximity to major populations
 - vi. Proximity to major transportation (rivers, barge access, rail access, roads)
 - vii. Geologic conditions (faults, mines, karsts, fracking)

Potential Study Activities

3. Identify ways for the State of Oklahoma to incentivize SMR development such as:
 - a. Inclusion of nuclear power as a resource option in a State clean energy plan
 - b. Join NARUC-NASEO Advanced Nuclear State Collaborative
 - c. Mitigate financial risks through mechanisms like:
 - i. State grants (i.e. Virginia H.B. 2386 (<https://lis.virginia.gov/cgi-bin/legp604.exe?231+sum+HB2386>)
 - ii. Annual cost recovery mechanism
 - iii. Regulatory mechanism for early work, i.e. Early Site Permit, Engineering, and NRC licensing (i.e. NCUC DOCKET NO. E-100, SUB 179; item 43; <https://starw1.ncuc.gov/NCUC/ViewFile.aspx?Id=7b947adf-b340-4c20-9368-9780dd88107a>)
 - iv. Other ideas available at: [State Legislation & Regulations Supporting Nuclear Energy NEI Compendium January 2023.pdf](#)
4. Address socioeconomic challenges and opportunities, such as:
 - a. workforce education, training, and development
 - b. local and state tax base
 - c. supply chain development and secondary benefits
 - d. permanent and temporary job creation
 - e. First of a Kind (FOAK) and Fast Follower Inflation Reduction Act benefits
 - f. additional economic development opportunities (attracting other businesses looking for clean & reliable power)
5. Example studies:
 - a. <https://www.michigan.gov/mpsc/commission/workgroups/nuclear-feasibility-study>
 - b. <https://www.purdue.edu/administrative-operations/nuclear/documents/smr-feasibility-study-interim-report.pdf>
 - c. <https://inldigitalibrary.inl.gov/sites/sti/sti/5581208.pdf>



Appendix

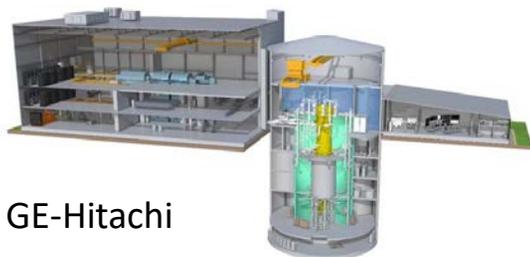


What is a Small Modular Reactor (SMR)

- **Small** – power capacity up to 300 MW(e) per unit, 1/3 size of traditional nuclear reactors
- **Modular** – unit components are factory-manufactured, transported and assembled on site
- **Reactors** – harnessing nuclear fission to generate heat to produce energy
- **Safe** – design allows safe shut down without human intervention
- **Cost Savings** – modularization cost reduction for Nth of a kind (NOAK) vs traditional nuclear
- **Federal IIJA and IRA** - quicken research, development, and deployment of emerging tech
- Dozens of designs proposed, two categories: water cooled or non-water cooled

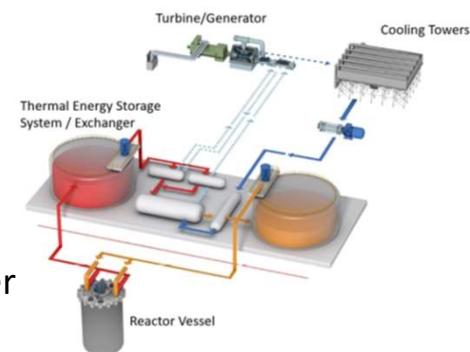
Water
Cooled
Reactor

example: GE-Hitachi



Non-Water
Cooled
Reactor

example: Terra Power

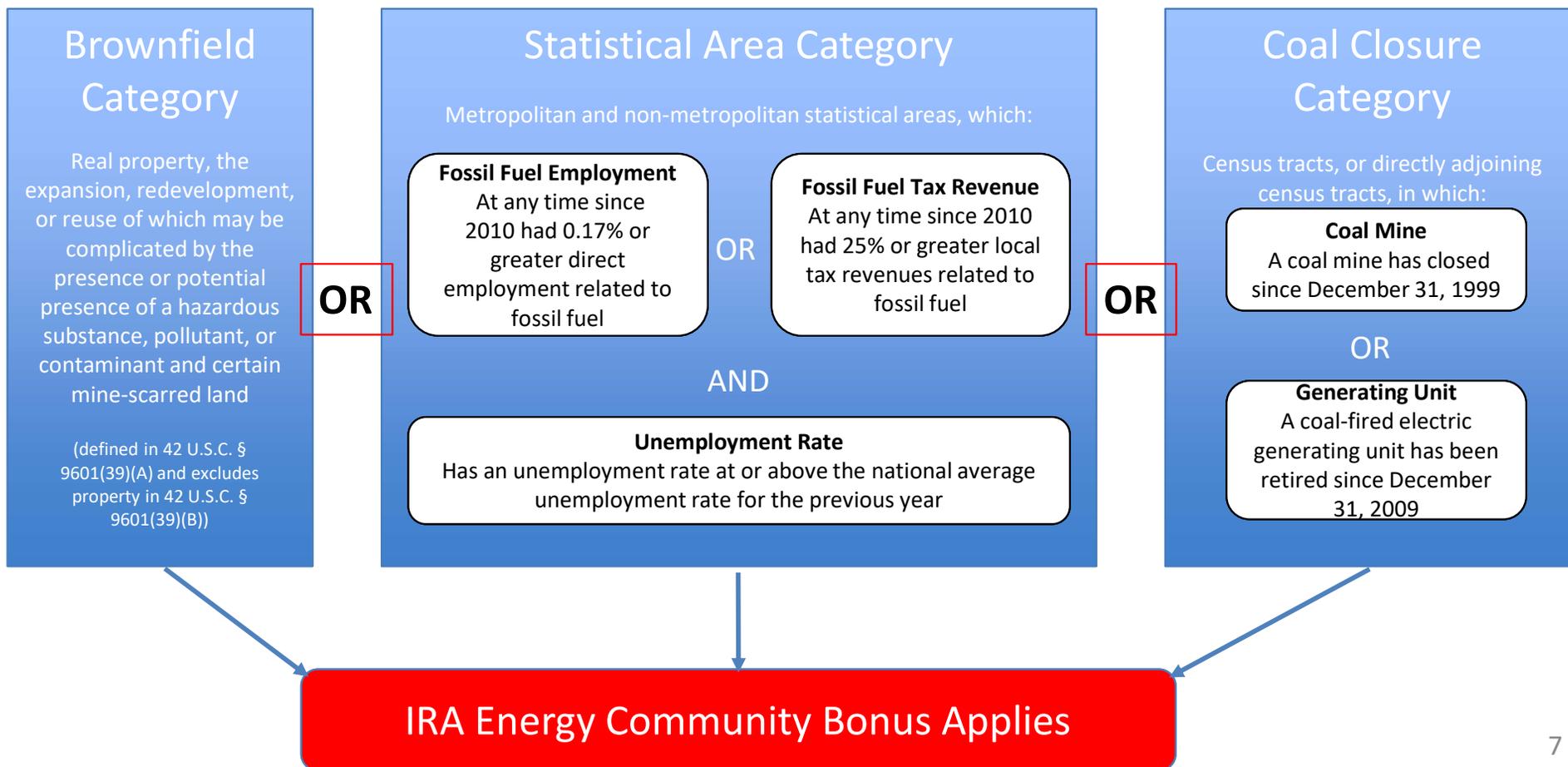


EPRI Siting Guide Overview

*EPRI nuclear siting guide
incorporates lessons learned over
the years and includes SMR
considerations*



Energy Community Bonus





OKLAHOMA
Corporation Commission

**Oklahoma Nuclear Energy Generation
Feasibility Study**