37th Annual Texas Environmental Superconference

Nuclear Energy and Uranium Mining *"Good and Plenty"*

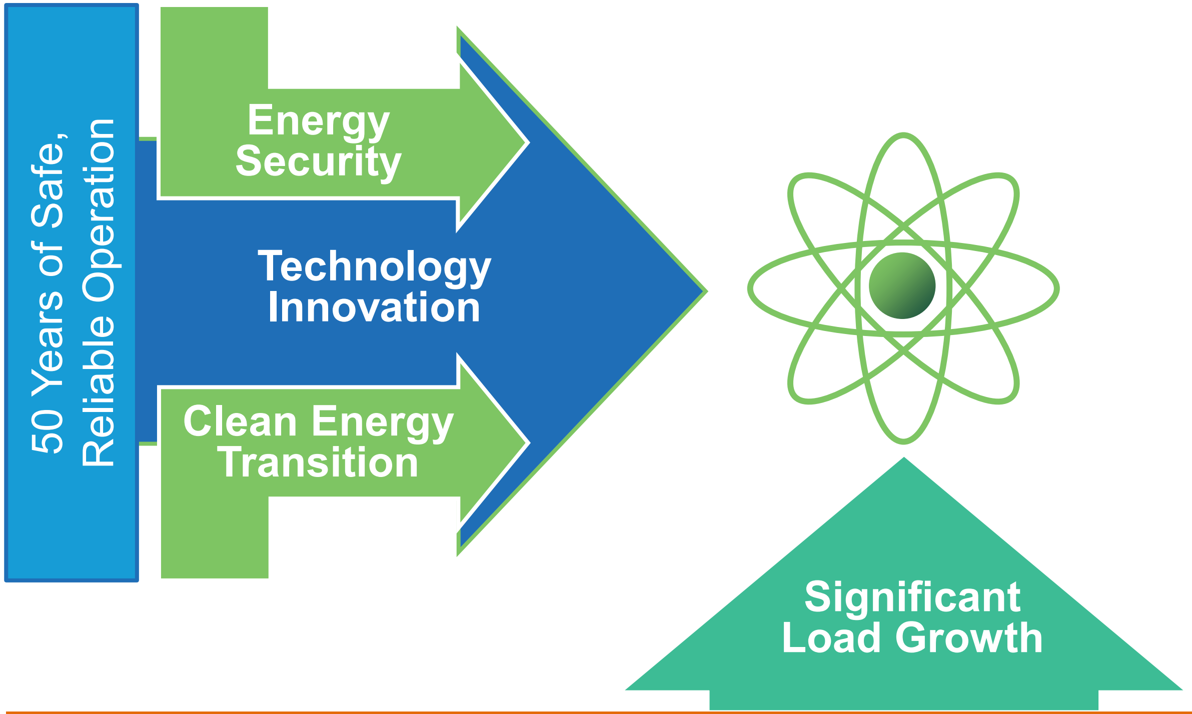
Kym Harshaw, *Executive VP & Chief Nuclear Officer - Retired, STP Nuclear Operating Co.*

Marty O'Neill, *Associate General Counsel, Nuclear Energy Institute*

Colleen Grygier*, Senior Attorney, Hunton Andrews Kurth LLP*

August 8, 2025 Austin, TX

Nuclear Energy's Future: A Confluence of Drivers



Bipartisan Political Support

Nuclear Power Uniquely Suited for this Moment

- Resilient
- Firm
- Clean
- Versatile
- Proven
- Scalable

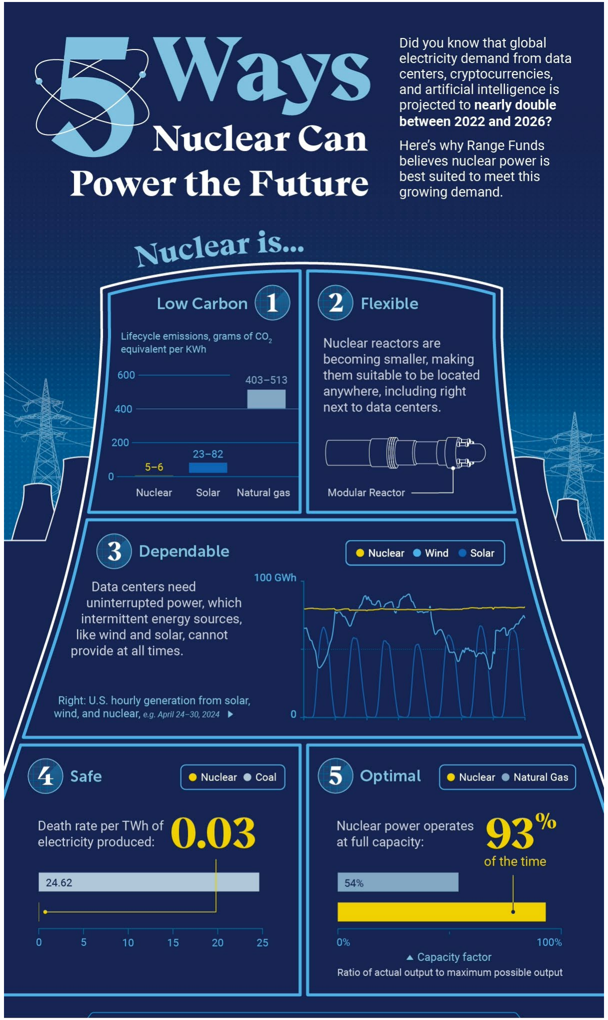
Nuclear Energy's Unique Value Proposition

NEI

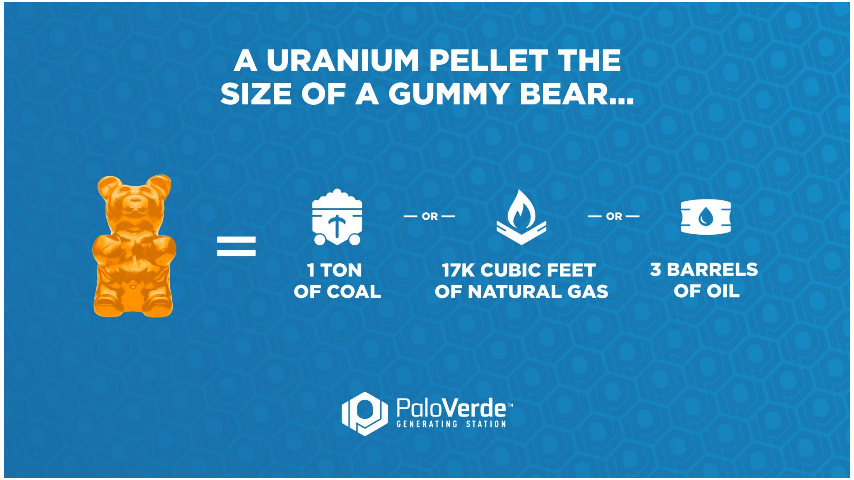
High ■ ■ ■ Low

	Clean?	Firm?	Low land use?	Low transmission buildout?	Concentrated local economic benefits?	Direct heat applications?
Nuclear	High	High	High	High	High	High
Geothermal	High	High	High	Medium	Medium	Medium
Hydropower	High	Medium	Low	Medium	High	Low
Renewables + LDES	High	Medium	Low	Low	Low	Low
Renewables: offshore	High	Medium	High	Low	Low	Low
Renewables: onshore	High	Low	Low	Low	Low	Low
Natural gas + CCS	Medium	High	Medium	High	Medium	Medium
Coal + CCS	Medium	High	Medium	High	High	Medium
Natural gas	Low	High	Medium	High	Medium	Medium
Coal	Low	High	Medium	High	High	Medium

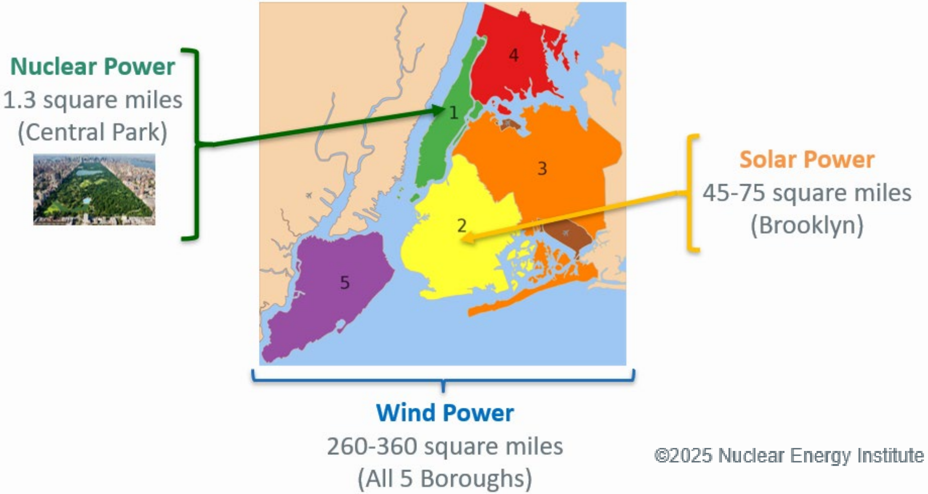
Source: DOE, *Pathways to Commercial Liftoff: Advanced Nuclear* (Sept. 2024), available at https://www.energy.gov/lpo/pathways-commercial-liftoff-reports



Source: Visual Capitalist



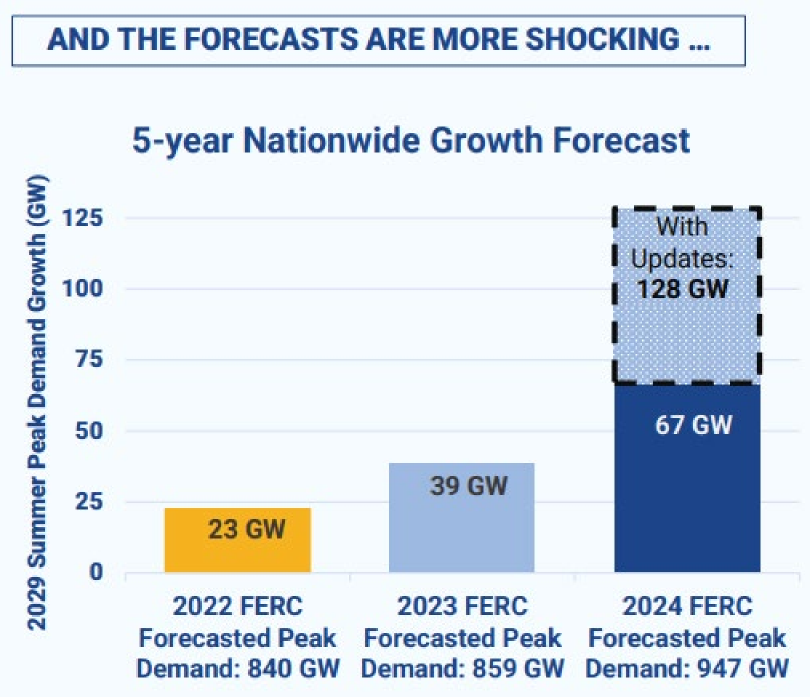
Small Geographical Footprint for 1000 MW



The End of Flat Power Demand in the U.S.

Three Key Points:

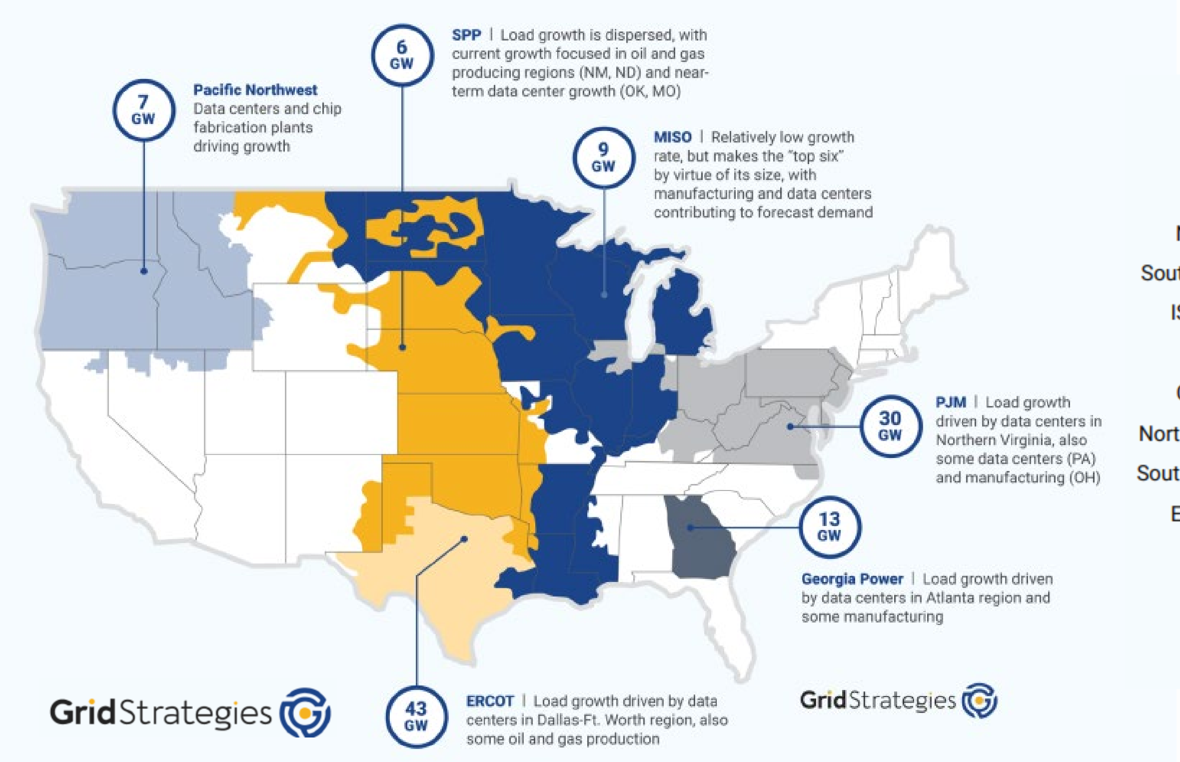
1. Over the past two years, the 5-year load growth forecast has increased by almost a factor of five, from 23 GW to 128 GW.
2. The main drivers are investment in new manufacturing, industrial, and **data center** facilities.
3. The U.S. electric grid is not prepared for significant load growth.

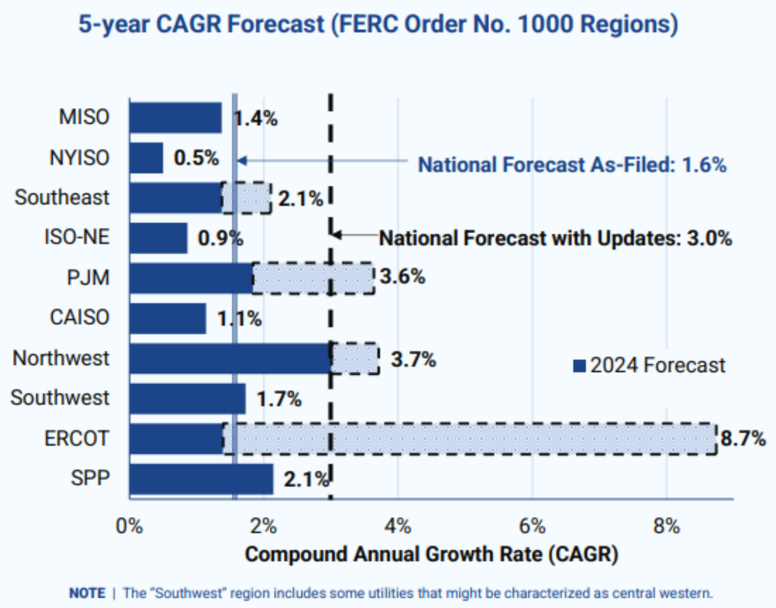


GridStrategies

Source: https://gridstrategiesllc.com/wp-content/uploads/National-Load-Growth-Report-2024.pdf

ERCOT Is a Major Driver of Load Growth





Source: https://gridstrategiesllc.com/wp-content/uploads/National-Load-Growth-Report-2024.pdf

Data Centers Are Driving Growth in Texas

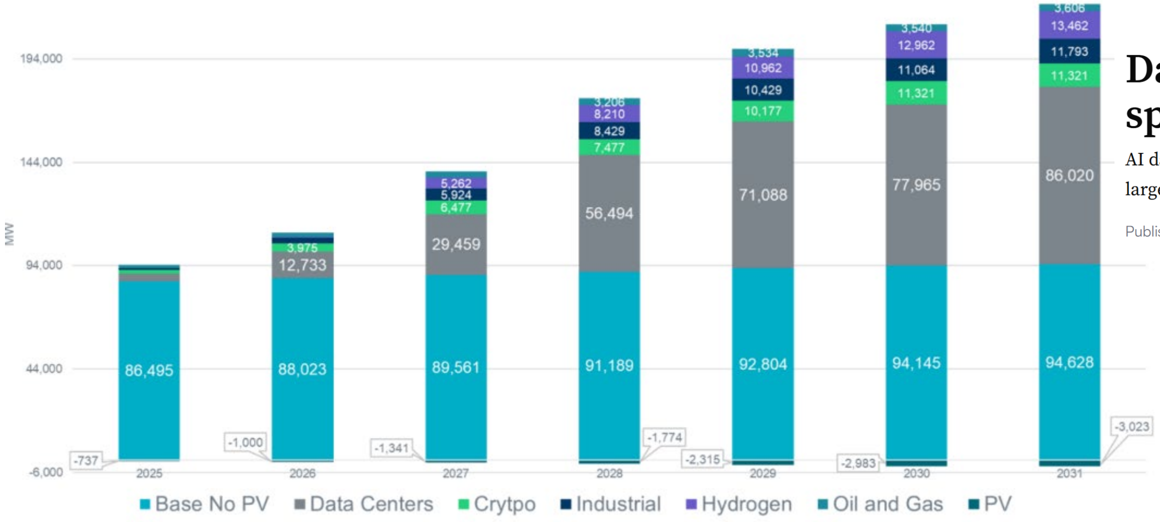
Data Centers Are Booming in Texas. What Does That Mean for the Grid?

The rise of artificial intelligence, the digitization of the economy and everyday life's growing computing needs have turbocharged the expansion of data centers, driving up a surge in electricity demand

By Associated Press | Jan. 24, 2025, at 12:41 p.m.

U.S.News & WORLD REPORT

Figure 3: Large Load by Type



Texas law gives grid operator power to disconnect data centers during crisis

The new law pairs mandatory curtailment with a voluntary demand response procurement program.

Published June 25, 2025 UTILITY DIVE

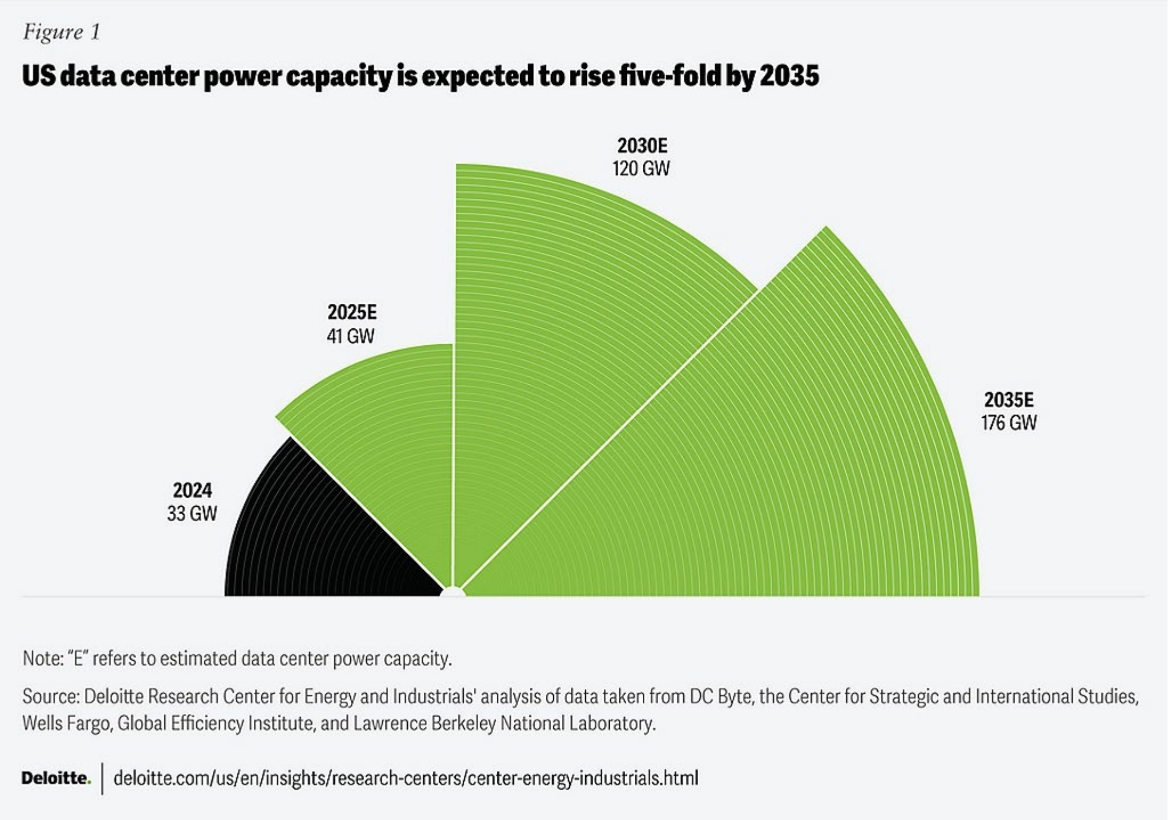
Data center activity 'exploded' in Texas, spiking reliability risks: monitor

AI data centers have power demand patterns similar to steel mills, with "very fast, very large ramps," according to David Penny, director of reliability services for Texas RE.

Published July 14, 2025 UTILITY DIVE

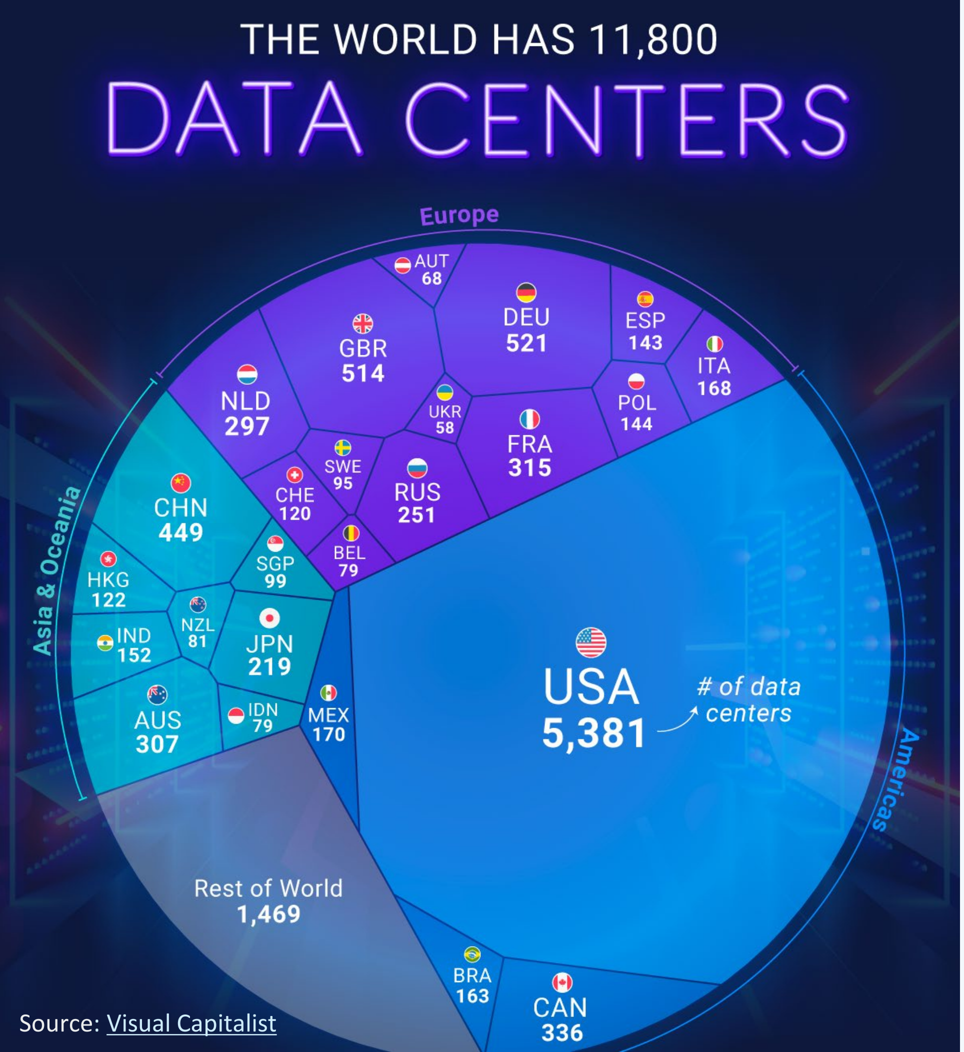
[ERCOT 2025 Long-Term Load Forecast Report (Apr. 2025)]

The Rapid Growth of U.S. Data Centers



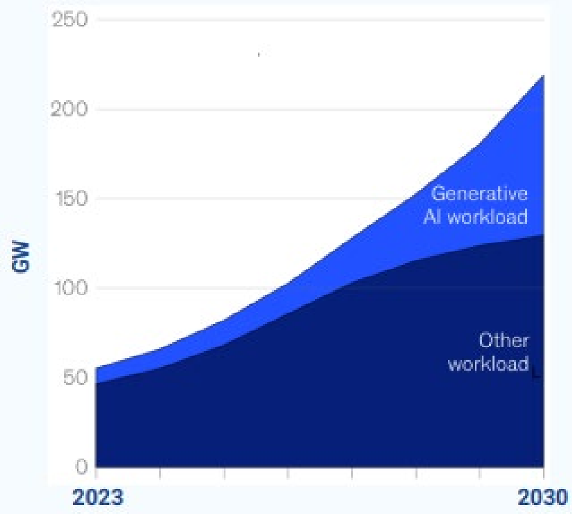
Deloitte, Nuclear energy's role in powering data center growth (Apr. 9, 2025)

U.S. DOE, Advantages and Challenges of Nuclear-Powered Data Centers (Apr. 8, 2025)



Source: Visual Capitalist

Global Data Center Demand Forecast (McKinsey)



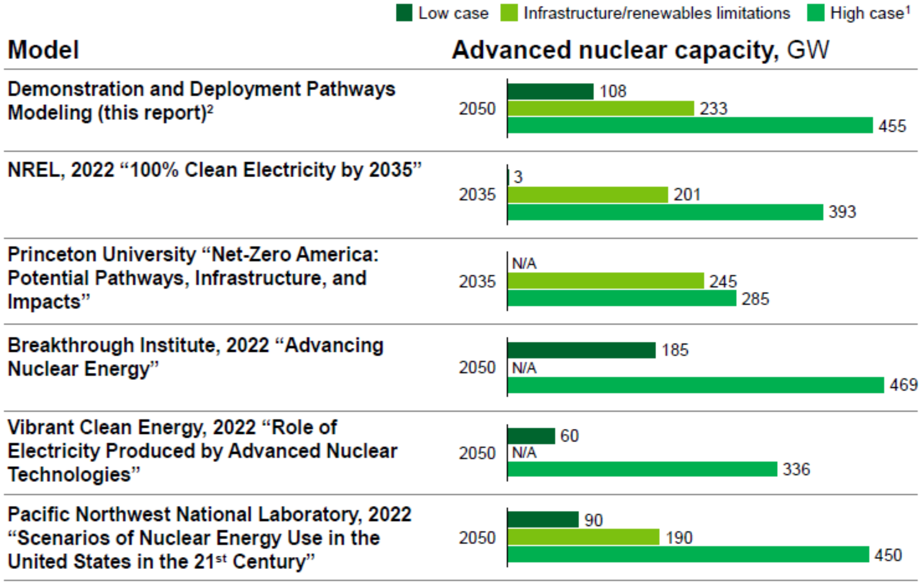
SOURCES | Barclays, Powering AI: Calibrating US Data Center Energy Demand (June 27, 2024).
Barclays, Powering AI: The Power & Land Arms Race (July 23, 2024).
Barclays, What's Next in AI? A Framework for Thinking About Inference Compute (October 22, 2024).
E3, Load Growth Is Here to Stay, but Are Data Centers? (July 2024).
McKinsey, AI Power: Expanding Data Center Capacity to Meet Growing Demand (October 2024).
Reuters, AI's Race for US Energy Butts Up Against Bitcoin Mining (August 2024).
Wood Mackenzie, Gridlock: The Demand Dilemma Facing the US Power Industry (October 2024).
WSJ, AI-Ready Data Centers are Poised for Fast Growth (August 2023).

GridStrategies

DOE Projects Major Demand for Nuclear

https://liftoff.energy.gov/advanced-nuclear-2/

Modeling results show demand for 200+GW of new nuclear capacity



1."Low" and "high" refer to the level of nuclear build out; methodology for "low" and "high" nuclear build-out cases differ report to report; 2. NZD Low-RES case sensitivities shown

DOE posits that NRC would need to scale its license-application capacity from **~0.5 GW per year to ~13 GW per year** to meet projected demand.

What Does This Mean for the Nuclear Industry?

Huge Opportunities for Growth!

Current Fleet

- SLRs are key
- Power uprates are back (est. 2.5GW+)
- Behind the Meter opportunities

Bright Future

New Reactors

- Opportunity likely greater than estimated (>200 GWe)
- Tech companies as driver
- Large plants getting attention now

Need to Get Going

Industry Plans for Second Renewals + New Nuclear

Recent NEI survey confirms nuclear energy's crucial role in meeting decarbonization goals

SLR

>90% of fleet expects to operate to at least **80 years**

>2X nuclear capacity

100 GW of new nuclear opportunity by **2050s**

Small modular reactors

Translates to ~ **300 SMR-scale plants;** new interest in large LWRs

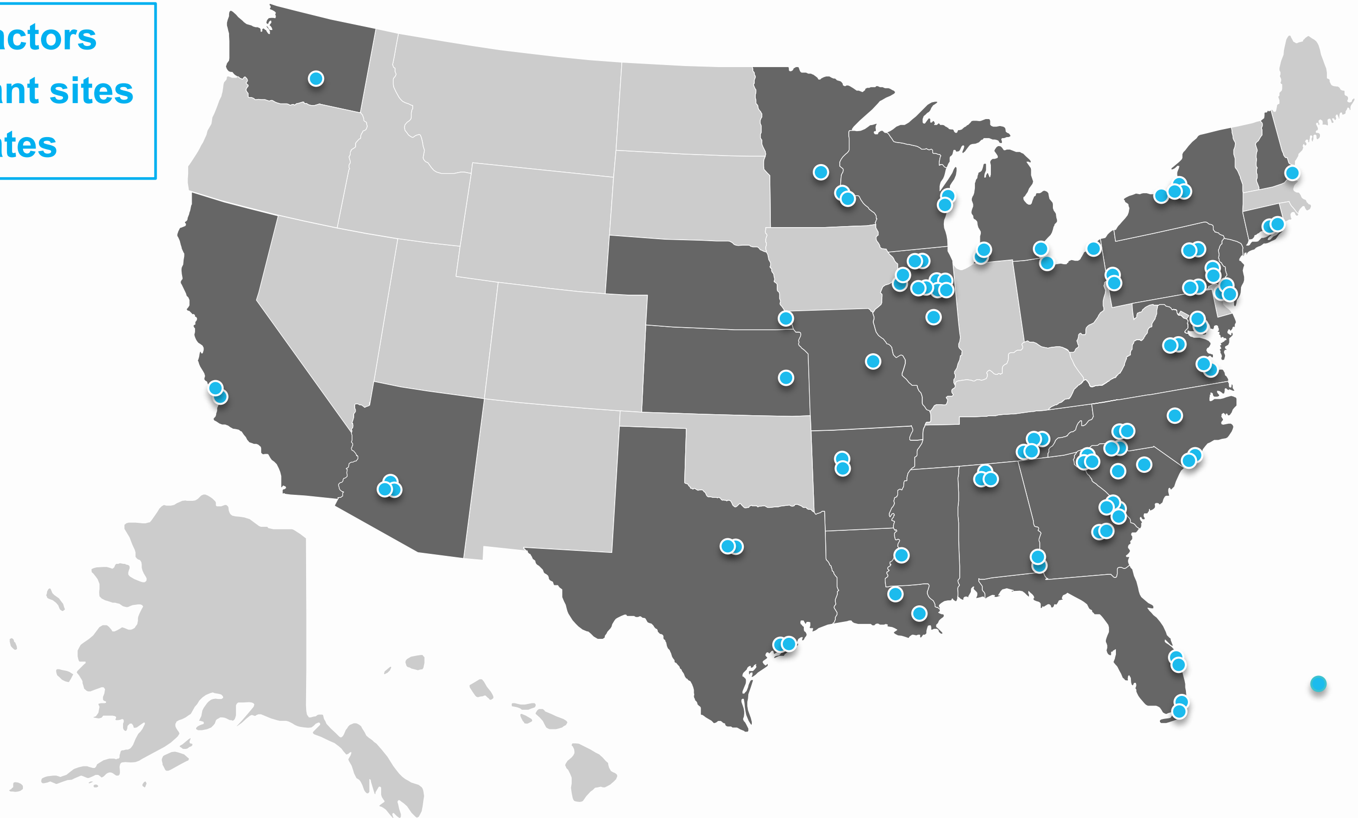
NEI member companies produce nearly half of all U.S. electricity

Reported interest in 23 Early Site Permits, 18-19 Construction Permits, and 8 Combined Operating Licenses (by 2034)

Source: NEI, The Future of Nuclear Power - 2024 Update Survey (Oct. 2024)

Current U.S. Nuclear Operating Fleet

94 reactors
54 plant sites
28 states



Total U.S. nuclear generation capacity **~ 97 GWe**

= **18.6%** of total U.S. electric generation in 2024

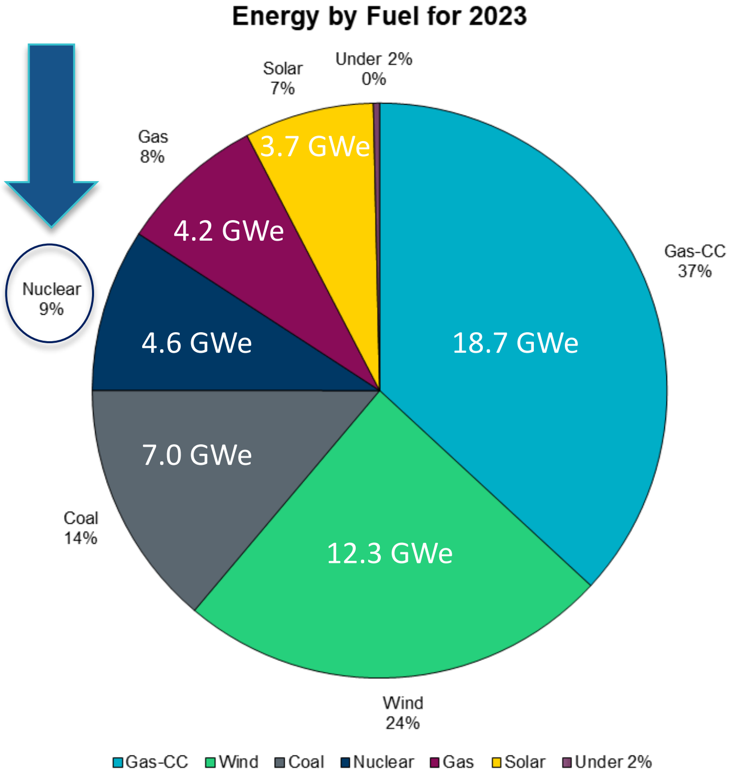
= **43.4%** of total U.S. **clean energy generation** in 2024

Nuclear power reactor

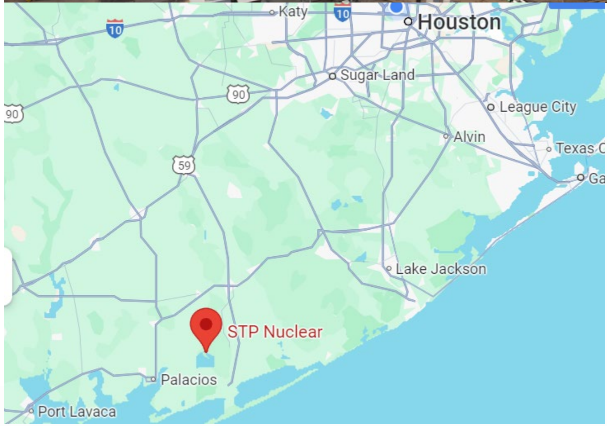
Updated:

Current Nuclear Generation in Texas

Comanche Peak Nuclear Plant



South Texas Project Generating Station



Source: ERCOT Fuel Mix Report: 2023
https://www.ercot.com/gridinfo/generation

Subsequent License Renewal Applications

Nearly all U.S. operating reactors have received their initial 20-year license renewals to operate to 60 years. Most are pursuing **second or subsequent license renewals (SLR)** that will allow operations out to 80 years.

13
Reactor SLRs Approved

12
SLR Applications Under Review

24+
Future SLR Applications Expected

In Aug. 2024, the Commission directed the NRC staff to complete LR/SLR proceedings within **18 months** and using no more than **14,000 staff hours**. See SRM-COMCTH-24-0003.

Source: U.S. Nuclear Regulatory Commission and news articles
Updated: July 2025

Renewed Interest in Power Uprates

- Significant renewed interest in power uprates; allow for quicker, cost-effective capacity increases relative to building new reactors
- Extended power uprates (up to 20%) and stretch power uprates (up to 7%) both under consideration
- Recent legislation, like the ADVANCE Act of 2024, provides financial incentives for power uprates
- NRC is actively working to improve its review processes for uprate applications
- NRC has approved 172 uprates since the 1970s, totaling about 8,030 MWe; last approved uprate was in 2021

Expected Power Uprate Applications (by unit)

Fiscal Year	Total Power Uprates Expected	Measurement Uncertainty Recapture Power Uprates	Stretch Power Uprates	Extended Power Uprates	Megawatts Thermal	Approximate Megawatts Electric
2026	3	1	0	2	1,075	355
2027	16	7	2	7	2,589	854
2028	0	0	0	8	2,281	753
2029	0	0	0	0	0	0
2030	3	2	0	1	554	183
TOTAL	**30**	**10**	**2**	**18**	**6,495**	**2,143**

Source: NRC, https://www.nrc.gov/reactors/operating/licensing/power-uprates/status-power-apps/expected-applications.html

Nuclear Plant Restart – Palisades

Palisades Nuclear Generating Station

- Covert Township, Michigan
- 800 MWe; shutdown in May 2022
- In October 2023, Holtec International initiated restart process with NRC
- Project restart supported by $1.52B in DOE loans and $1.3B in rural electric cooperative grants
- NRC approval expected this summer; Holtec targeting Fall 2025 restart

Nuclear Plant Restart – TMI Unit 1

Three Mile Island Nuclear Station, Unit 1

- Middletown, Pennsylvania
- 835 MW; shutdown in September 2019
- In September 2024, Constellation Energy announced the restart of Three Mile Island Unit 1 (TMI-1)
- Renamed the Crane Clean Energy Center
- Project supported by a partnership with Microsoft
- NRC formed Restart Panel in March 2025; regulatory submittals in progress

Large Customers Helping to Enable New Nuclear

NEI

More than 30 GWe of Total Commitments from Tech/Data Centers

Customers

- amazon
- DIGIPOWER X
- ENDEAVOR ENERGY
- EQUINIX
- GREEN ENERGY PARTNERS WATER TO ENERGY
- Google
- Meta
- ORACLE
- prometheus HYPERSCALE
- sabey Data Centers
- StandardPower
- switch

Advanced Nuclear Designers

- DEEP FISSION
- NANO Nuclear Energy Inc.
- Kairos Power
- NUSCALE Power for all humankind
- LAST ENERGY
- OKLO
- TerraPower
- X energy

Key Big Tech / Nuclear Energy Partnerships

- Microsoft
  - 20-yr PPA with **Constellation** to restart TMI Unit 1 by 2028
  - Agreement with **Helion Energy** (fusion company)
- Google
  - Partnered with **Kairos Power** to fund SMRs; first online by 2030
  - Funding 3 new nuclear sites with **Elementl Power** (600 MW each)
- Oracle
  - Exploring 3 SMRs for data centers
- Amazon Web Services
  - 10-yr PPA with **Talen** for 1.9 GW from Susquehanna nuclear plant in PA
  - SMR projects with **Energy Northwest** and **X-energy**
  - SMR exploration with **Dominion** near North Anna in VA
- Meta
  - 20-yr virtual PPA with **Constellation** (1,121 MW from Clinton plant)
  - Issued nuclear RFP in Dec 2024 for 1-4 GW by early 2030s

Note: SMR = small modular reactor

Key Attributes of Advanced Reactors

- Passive safety systems that rely on natural phenomena like gravity and natural circulation rather than active systems or operator intervention
- Advanced cooling systems like liquid metal or gas coolants
- Inherent reactivity control mechanisms to prevent criticality accidents
- Much smaller radionuclides source terms/inventories relative to current plants
- Lower operating pressures that help prevent damage to the reactor core or containment and limit the dispersal of radioactive materials.
- Robust containment structures, including below-grade or in-ground construction, which can withstand extreme external events
- Use of advanced fuels (e.g., TRISO) that can withstand extreme temperatures without degradation and contain fission products within the fuel itself

These Features Provide Multiple Layers of Defense-in-Depth

Types of Advanced Reactors

Range of sizes and features to meet diverse market needs

Water Cooled

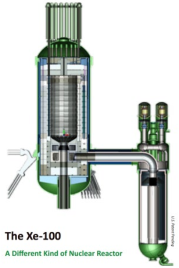
Non-Water Cooled: High Temp Gas Reactors | Liquid Metal Reactors | Molten Salt Reactors

Both

Westinghouse AP1000® (shown)
GE ABWR
GE ESBWR

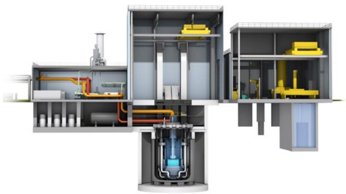
GEH BWRX-300(shown)
NuScale
Holtec SMR-300
Westinghouse AP300

High Temp Gas Reactors



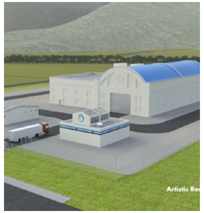
X-energy (shown)

Liquid Metal Reactors



TerraPower Natrium™ (shown)

Molten Salt Reactors



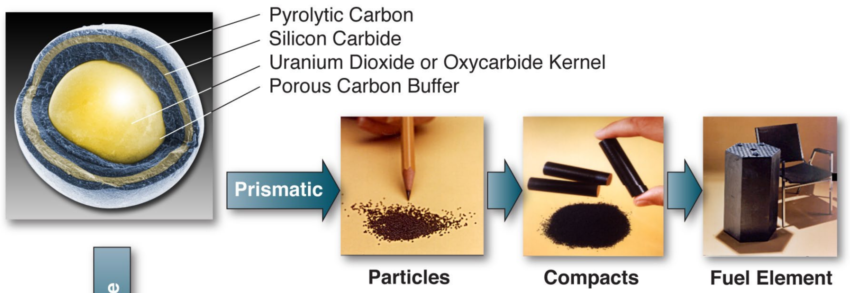
Kairos Hermes (shown)
Natura Resources

Oklo (shown)
Last Energy
Radiant
Westinghouse eVinci™

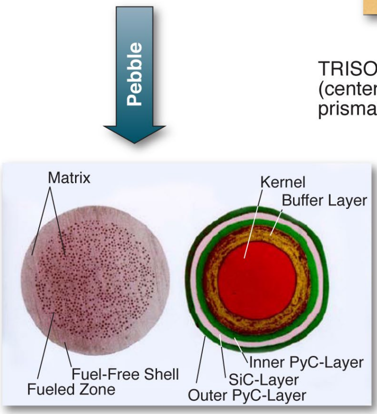
Large ~1000 MWe | Small Modular Reactors < 300 MWe | Micro < 50 MWe

Learn more about innovative technologies with the Nuclear Innovation Alliance.

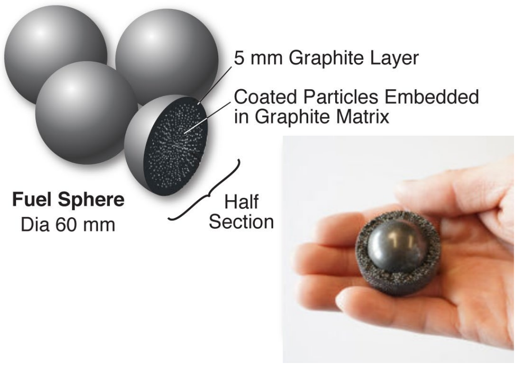
Key Enabling Tech – TRISO Fuel

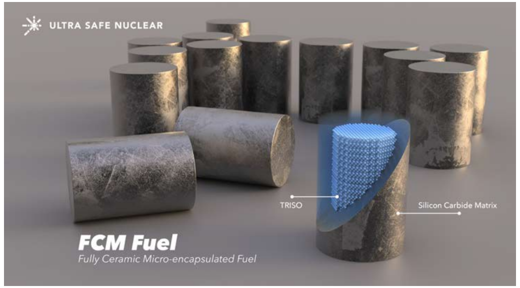


TRISO-coated fuel particles (left) are formed into fuel compacts (center) and inserted into graphite fuel elements (right) for the prismatic reactor



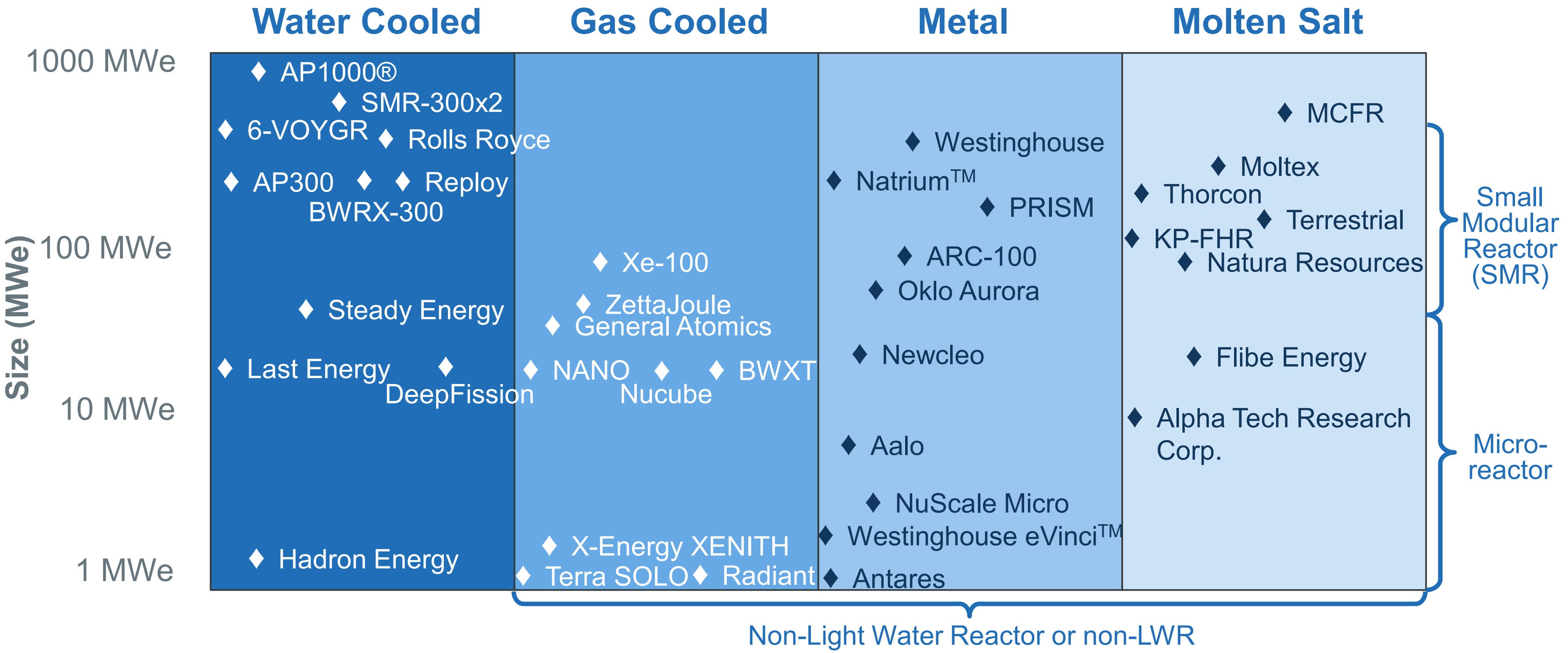
TRISO-coated fuel particles are formed into fuel spheres for pebble bed reactor





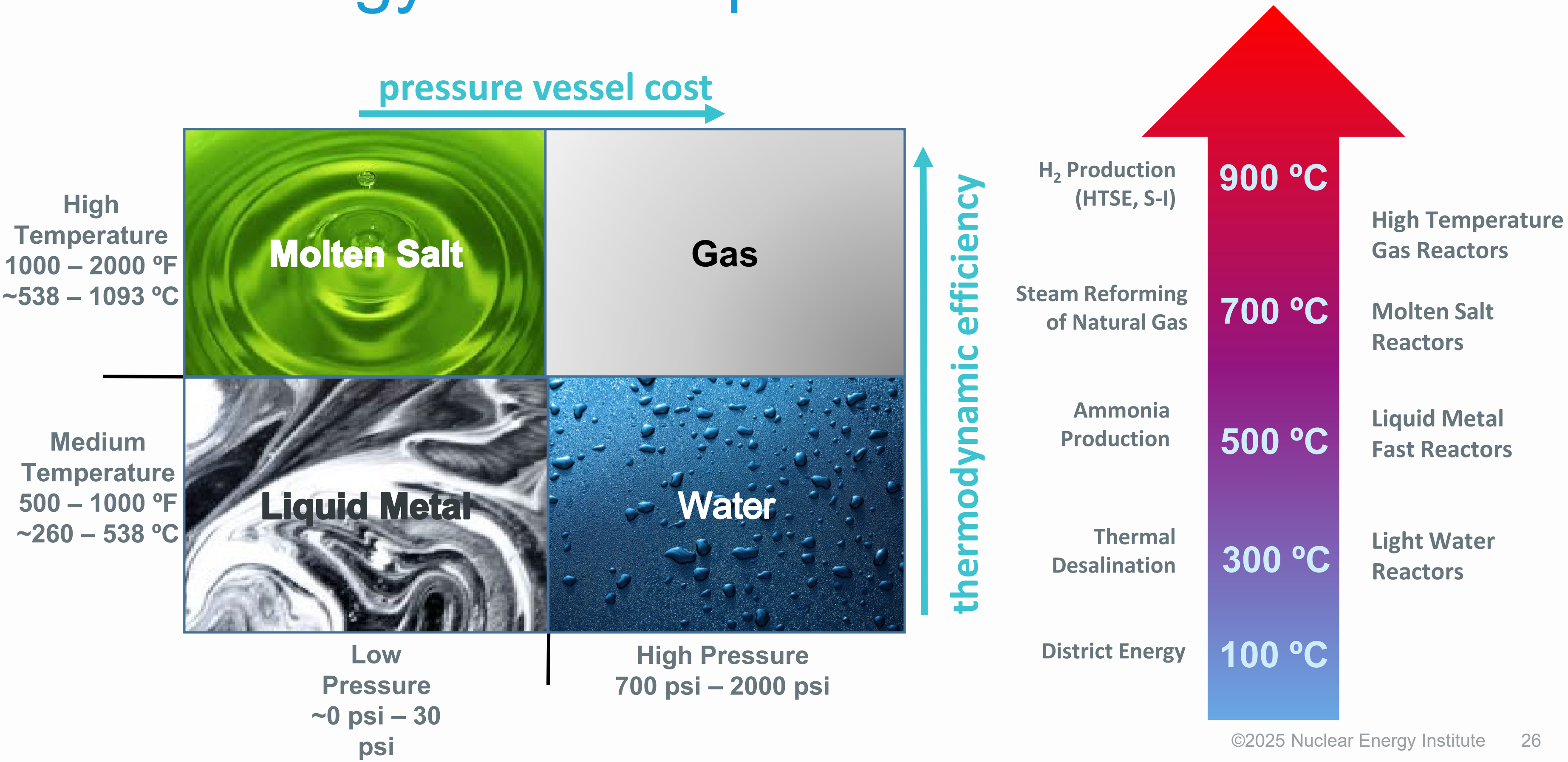
- Provides containment and can withstand temperatures well above accident conditions
- Higher operating temperatures – more efficient
- On-line refueling possible
- Passive decay heat removal

Advanced Nuclear Technologies*



* - partial list of technologies

Technology and Temperature



Advanced Nuclear Versatility – Many Use Cases

NEI

Spectrum of Sizes and Options

- Micro
- Small
- Large

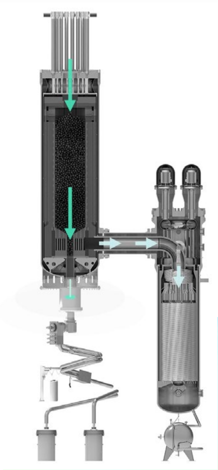
Variety of Outputs

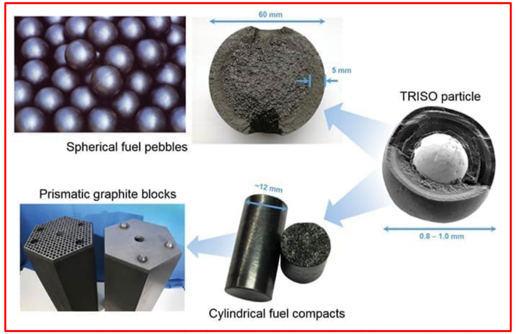
- Electricity
- Hydrogen
- Process Heat

Multitude of End Users

- Homes
- Vehicles
- Businesses
- Concrete
- Steel
- Agriculture
- Petrochemical
- Oil & Gas
- Data Centers
- Energy Transitions
- Maritime
- District Energy
- Space
- Mining
- Aviation
- Rail

Chemical Production





- Dow and X-energy
  - Joint development agreement
- 4-unit Xe-100 plant (TRISO fuel)
  - 4 modules @ 80 MWe each
  - Heat and electricity
- Advanced Reactor Demonstration Program awardee w/ U.S. DOE
- Seadrift, Texas

Upstream Oil and Gas Production

Significant efforts underway planning for heat and power from microreactors

SHEPHERD POWER

February 14, 2024

Robert Taylor
Deputy Director for New Reactors
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Delivered via Electronic Mail

Dear Mr. Taylor,

On behalf of Shepherd Power, an NOV company, I would like to thank the U.S. Nuclear Regulatory Commission ("NRC") staff for an engaging initial discussion on developing a commercially viable licensing pathway for microreactors. As we explained during our recent meeting, Shepherd Power intends to own and operate microreactors supplying clean heat and power to support our industry's goal of reducing greenhouse gas ("GHG") emissions. We expect initial deployments of microreactors to be operating in the field by 2030, with a sharp ramp up thereafter to several hundred.

Oklo Signs LOI to Supply 50 Megawatts of Power to Diamondback Energy

April 8, 2024

- **Oklo and Diamondback Energy signed a non-binding letter of intent (the "LOI") to collaborate on a 20-year Power Purchase Agreement.**
- **Diamondback aims to use Oklo's Aurora powerhouses to power its operations in the Permian Basin.**

Potential Micro-Reactor Markets

Challenges to New Nuclear Deployment

- Success with First-of-a-Kind Plants
  - EPC control; on time and on budget
- NRC Licensing Efficiency
  - Need for expedited licensing process
- Siting Issues
  - Public acceptance, state/local permits, technical data needs, grid connects
- Reliable Fuel Supply
  - Most advanced reactors will require HALEU or specialized fuel forms
- Firm Commercial Agreements
  - Needed for debt and equity financing
- Supply Chain Ramp-up
  - Rebuilding domestic supply chain; need vertical integration
- Workforce Expansion
  - Licensing, construction, supply chain, plant operation
- Facilitation of Exports
  - Market competition from China, Russia, South Korea
- Used Fuel Management
  - Still lack permanent disposal site; opposition to CISF in TX, NM

Deloitte, Nuclear energy's role in powering data center growth (Apr. 9, 2025)
DOE, *Pathways to Commercial Liftoff: Advanced Nuclear* (Sept. 2024)

Bipartisan Support for Nuclear Energy

Nuclear Energy Innovation and Modernization Act (2019)

Infrastructure Investment & Jobs Act (2021)

- Operating nuclear plant credit program
- Advanced reactor demonstration funding
- Large-scale H_2 demos

CHIPS and Science Act (2022)

- Assistance for nuclear RD&D; university support

Inflation Reduction Act (2022)

- Tax credits for existing reactors
- Tax credits for all new clean generation
- Tax credits for H_2 generation
- Expanded federal loan guarantees

40-year Price-Anderson Act Extension (2024)

ADVANCE Act (2024)

- Modernization; efficiency

Key Federal Policies

Bipartisan Infrastructure Law
November 15, 2021

Advanced Reactor Demonstration Program (ARDP) Funding
$2.5B for two commercial demos

Nuclear Hydrogen Hub
$8B total

Civil Nuclear Credit Program
$6B to support financially challenged plants

Inflation Reduction Act
August 16, 2022

Production Tax Credit (PTC) for Operating Plants
Up to $15 per MWh

Technology-Inclusive PTC for Clean Electricity
$30 per MWh

Technology-Inclusive Investment Tax Credit (ITC) for Clean Electricity
30% + 10% in energy communities + 10% using U.S. components

Clean Hydrogen Credit
$3 per kilogram

118th Congress

Nuclear Fuel Security Act
LEU/HALEU domestic production authorizing legislation in FY 2024 NDAA
(December 22, 2023)

FY 2024 Appropriations Legislation
$2.72 Billion for domestic fuel production
(March 9, 2024)

Additional $800 Million for Small Modular Reactors (March 9, 2024)

40 Year Reauthorization of the Price-Anderson Indemnification Act
(March 23, 2024)

ADVANCE Act
Increase regulatory efficiency & reduce regulatory costs (July 9, 2024)

NEI

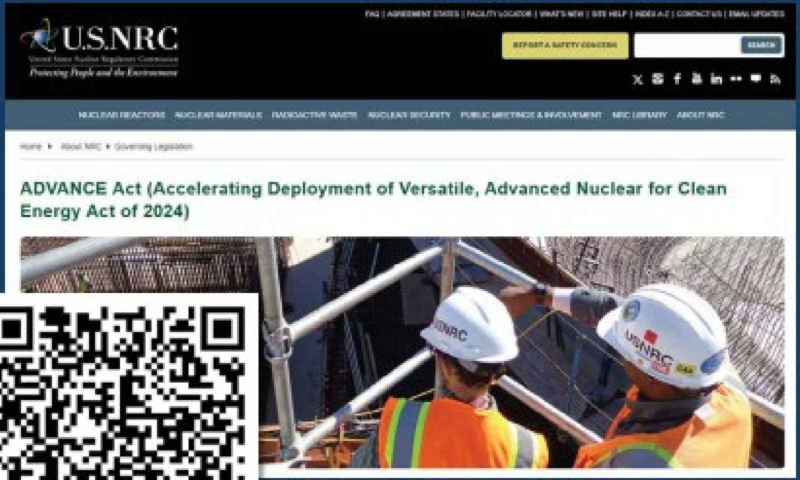
ADVANCE Act of 2024

NEI

- The Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024 (ADVANCE Act) (Pub. L. 118-67, div. B) enacted on July 9, 2024, seeks to **modernize U.S. nuclear regulatory framework** and **foster rapid deployment of advanced reactor technologies**. Among other things, it directs the NRC to:
  - Update its mission statement to reflect need to enable and not “unnecessarily limit” the safe and secure use and deployment of civilian nuclear energy technologies
  - **Implement initiatives for efficient, timely, and predictable licensing reviews, including modernizing and streamlining NRC’s environmental review process**
  - Establish expedited procedure for reviewing qualifying new reactor license applications
  - Implement changes to how the agency recovers fees from licensees
  - **Assess the licensing review process for new nuclear facilities at former fossil-fuel power plant sites and brownfield sites**
  - **Develop licensing strategies and guidance for microreactors**
  - Remove certain limitations on foreign ownership of some types of licensed facilities

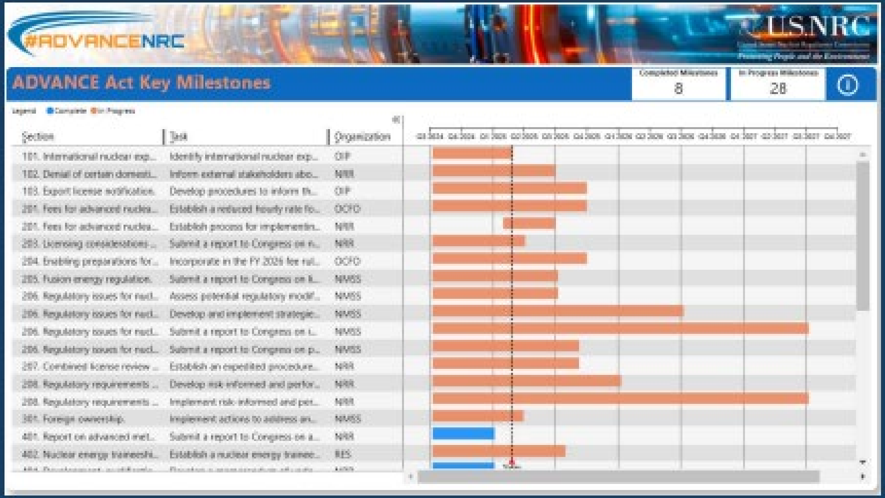
NRC ADVANCE Act Implementation

NRC's public ADVANCE Act webpage*



* https://www.nrc.gov/about-nrc/governing-laws/advance-act.html

Implementation status dashboard is available on the ADVANCE Act webpage



https://www.nrc.gov/about-nrc/governing-laws/advance-act.html

Key Enablers from Executive Orders on Nuclear Energy

National Security (14299), NRC Reform (14300), DOE Testing (14301), and Industrial Base (14302)

NEI

Add 300 Gigawatts of U.S. Nuclear Capacity by 2050

- Restarts and power uprates
- 10 large reactors in construction by 2030

1 Speed up Nuclear Reactor Licensing

- NRC licensing less than 18 months
- Faster for DOE/DoD tested designs

2 Lay the Ground-Work for Faster Reactor Testing

- Pilot 3 reactors outside of labs
- Expand DOE testing pathways

3 Deploy U.S. Reactors for AI and Military Bases

- Operate at DoD facilities in 3 years
- AI as critical defense facilities

4 Amp Up Domestic Nuclear Fuel Production

- Maximize domestic fuel production
- Mine, enrich, convert, de-convert

5 Assess Spent Fuel and Recycling

- Recommend a National policy
- Safe, Secure Long Term Fuel Cycle

6 Expand U.S. Nuclear Energy Exports

- Compete for civil nuclear globally
- Pursue new 123 Agreements

7 Bolster the American Nuclear Workforce

- Increase nuclear apprenticeships
- Prioritize nuclear energy careers

Reference: https://www.energy.gov/ne/articles/9-key-takeaways-president-trumps-executive-orders-nuclear-energy

EO 14299: National Security

Purpose:

- Rapidly deploy advanced nuclear to support national security objectives, including powering artificial intelligence (AI) computing infrastructure and national security installations

Key Elements:

- Deployment and Use at Military Installations [Sec. 3(a)-(d)]
- Deployment and Use at DOE Facilities [Sec. 4(a)-(c)]
- Provision of Fuel for Deployed Reactors [Sec. 5(b)]
- Streamlining of NEPA for Deployment [Sec. 7]
- Promoting of Nuclear Exports [Secs. 8 & 9]

EO 14300: Reform of the NRC

Purpose:

- Reduce our dependence on foreign technologies, decrease regulatory barriers, and support our domestic nuclear industry

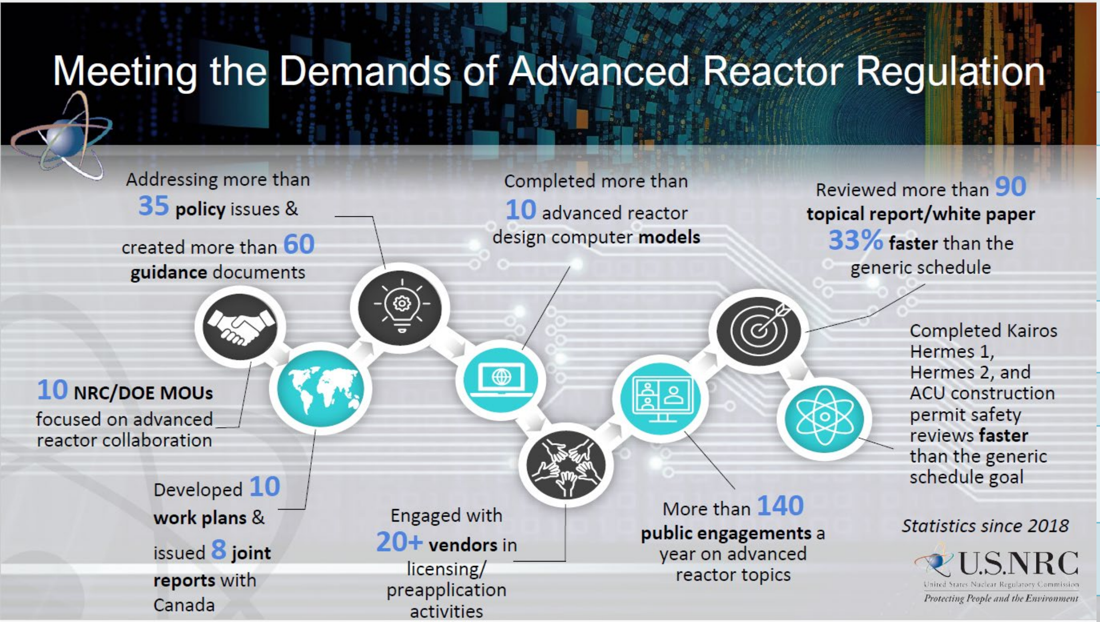
Key Elements:

- Reforming the NRC's Culture
- Reforming the NRC's Structure
- “Wholesale Revision” of NRC Regs. (NOPR by 2/23/26; Final by 11/23/26)
    - **Fixed licensing deadlines**
    - Science-based radiation limits
    - **Reform NRC’s NEPA approach**
    - Expedited acceptance of DOE/DOD licenses
    - **High-volume licensing process**
    - Limit changes during construction
    - Revise ROP and security rules
    - Limits on credible risks
    - Reconsider license durations
    - **Streamline hearing processes**
    - Reduced ACRS role

NRC Reform – Key Outcomes

1. NRC reorganization to promote expeditious licensing and technology innovation
   a. NRC's Mission include facilitating nuclear energy while ensuring safety
   b. More focused reviews by the Advisory Committee on Reactor Safeguards (ACRS)
2. **Wholesale update to NRC regulations and guidance by <u>November 23, 2026</u>**
   a. Establish team of 20 people to draft new regulations
   b. Proposed rule by **<u>February 23, 2026</u>**
3. **Establish fixed deadlines for reviews – new reactors < 18 mos., operating < 12 mos.**
4. Adopt thresholds to focus safety assessments on credible realistic risks
5. Adopt science-based radiation limits, reconsider LNT and ALARA
6. **Streamline public hearing process**
7. **Establish process for high-volume licensing, consider general license**
8. **NRC create expedited licensing of DOE demonstrated safe designs**
9. Establish stringent thresholds for NRC demanded changes during construction
10. Extend effective period of renewed licenses based on technical and safety data

Significant Progress Being Made at NRC



Regulatory Review Project	Planned Review Schedule	Executed Safety Review Schedule	% Under Resource Estimate
Kairos Hermes 1	21 months	18 months	6%
Kairos Hermes 2	14 months	10 months	43%
Abilene Christian University Molten Salt Research Reactor	22 months	21 months	13%
COLUMBIA Class Propulsion Plant	14 months	10 months	29%
NuScale	24 months	22 months	13%
TerraPower Kemmerer 1 (In Progress)	27 months	18 months*	On target
Long Mott Generating Station (In Progress)	18 months	18 months*	On target

*Projected based on current execution

Source: Greg Bowman, NRC, "Overview of U.S. NRC New Reactor Readiness Activities" (June 26, 2025)

EO 14301: Reform of Testing at DOE

Purpose:

- Establish a new DOE test reactor pilot program and streamline DOE regulations to enable rapid deployment at DOE and national lab sites

Key Elements:

- Reforming the National Laboratory Process for Reactor Testing [Sec. 4]
  - Guidance on meaning of “qualified test reactor” (QTR)
  - Procedures to ensure QTRs can be operational within 2 years
  - Dedicated teams to support QTR application processing
- Establishing a Pilot Program Outside the National Laboratories [Sec. 5]
  - **Aims to build three new reactors and achieve criticality by July 4, 2026**
- Streamlining Environmental Reviews by June 30, 2025 [Sec. 6]

EO 14302: Nuclear Industrial Base

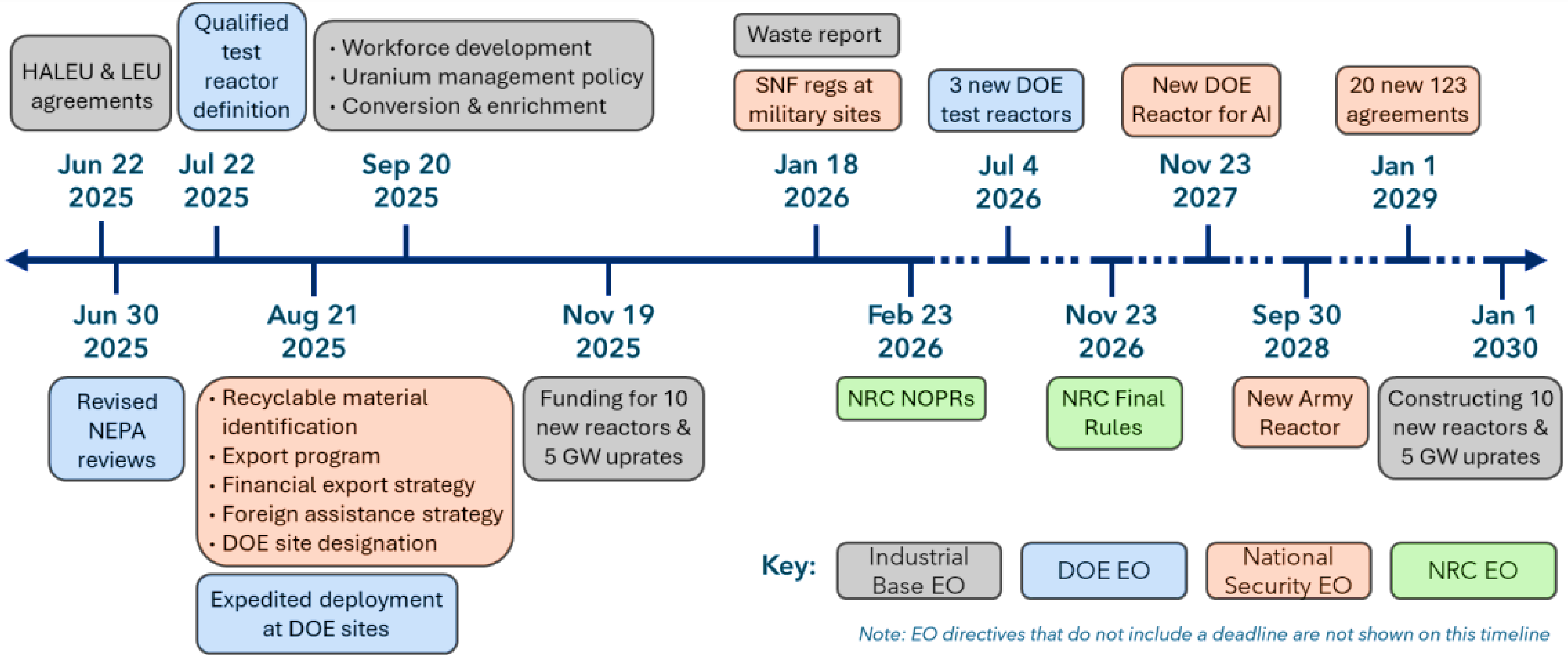
Purpose:

- Rebuild the domestic nuclear fuel cycle, accelerate advanced reactor deployment, and invest in a skilled workforce for long-term security

Key Elements:

- Plant Restarts Power Uprates, and Advanced Reactor Deployment
  - **Undertake uprates totaling 5 GW**
  - **Initiate construction of 10 large nuclear reactors by 2030**
- Funding and Financial Incentives
- **Strengthening the Domestic Nuclear Fuel Cycle (expand U.S. domestic mining, conversion, enrichment capabilities)**
- Enhancing Spent Fuel Management
- Expanding the Nuclear Energy Workforce

Timeline of Executive Order Directives



Source: Nuclear Innovation Alliance, https://nuclearinnovationalliance.org/fact-sheet-president-trumps-nuclear-energy-executive-orders

State Support for Nuclear Energy

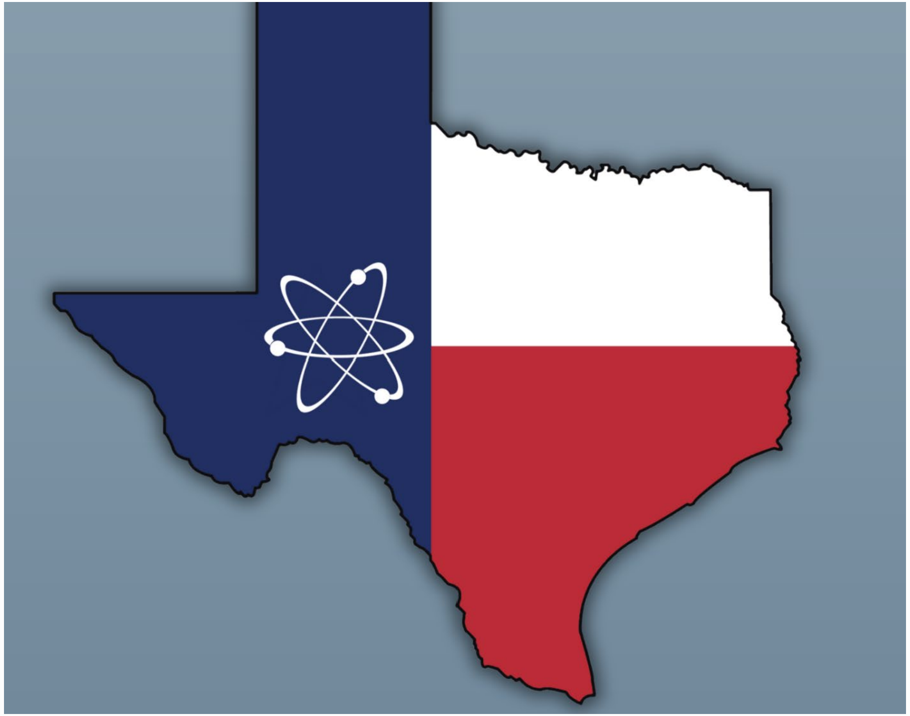
Type of Action	States Taking Actions
Exploring Nuclear Technology with Studies, Working Groups, Commissions and Task Forces	Connecticut, Indiana, Kentucky, Louisiana, Maryland, Michigan, Ohio, Tennessee, New Hampshire, Nebraska, Montana, Pennsylvania, Florida, Virginia, Idaho, North Dakota, **Texas**, Oklahoma, Arkansas, Hawaii, Wisconsin and Utah
Recognizing Nuclear as a Clean Energy Resource	Idaho, Michigan, Minnesota, North Carolina, Virginia, Tennessee, Ohio, Utah, Washington, New Mexico and Colorado
Removing Barriers and Signaling Support	Repealing Nuclear Moratoriums: Wisconsin, Kentucky, Montana, West Virginia, Connecticut, Illinois
Incentivizing Nuclear Technology and Supply Chain	Kentucky, Michigan, Tennessee, Virginia, Washington, Indiana, Texas and Wyoming

https://www.nei.org/resources/reports-briefs/state-legislation-and-regulations

https://www.naruc.org/core-sectors/electricity-energy/nuclear-energy/naruc-naseo-advanced-nuclear-state-action-tracker/

Texas as a Global Leader in Advanced Nuclear

- In 2023, Governor Abbott directed the PUCT to establish a working group to study and plan for Advanced Nuclear Energy (PUCT Docket 55421)
- Report to identify legislative solutions to support making Texas the national leader in using Advanced Nuclear
- Texas Advanced Nuclear Reactor Working Group established; led by Commissioner Jimmy Glotfelty
- Report issued on Nov. 18, 2024, with Seven Legislative Recommendations



The Blueprint: Working Group Recommendations

- Create Texas Advanced Nuclear Authority
- Establish Texas Nuclear Permitting Officer
- Workforce Development Program
- Texas Advanced Manufacturing Institute
- Texas Nuclear Public Outreach Program
- Texas Nuclear Energy and Supply Chain Fund
- Texas Nuclear Energy Fund

Implementing the Blueprint: 89th Legislative Session

- **HB 14** – Signed by Governor
  - Establishes Texas Advanced Nuclear Energy Office
  - Establishes Texas Advanced Nuclear Development Fund
  - Grants for project development capped at lesser of 50% of qualifying expenses or $12.5 million
  - Grants for construction capped at lesser 50% of qualifying expenses or $120M
  - Completion Bonus Grants for Grid-Capable Reactors
- **HB 500** – Appropriated **$350 million** for the above
- **SB 1534** – Requires a study of health physics education in the state
- **SB 1535** – Establishes the Texas Advanced Nuclear Energy Workforce Development Program
- **SB 1061** – Streamlines uranium mining permitting

The Texas Nuclear Alliance

- The Texas Nuclear Alliance is the only industry association in Texas dedicated to the advancement of nuclear technology
- Mission is to “make Texas the Nuclear Capital of the World”
- 50+ members include utilities, advanced reactor designers, uranium mining companies, and universities. NEI is a member
- TNA hosted its inaugural Texas Nuclear Summit from Nov. 17-19, 2024, in Austin, TX
- 2025 Texas Nuclear Summit will be held in Downtown Austin from October 15-17, 2025 at the Fairmont Hotel in Austin

Texas Projects – X-energy/Dow Partnership

- In 2023, X-energy and Dow announced the proposed siting of a four-unit 320-MWe Xe-100 advanced small modular reactor (SMR) facility at the Union Carbide Corp. Seadrift Operations site in Seadrift, TX, near Port Lavaca
- **Long Mott Generating Station** will provide power and steam to Dow’s facility
- The Xe-100 reactor is an 80-MWe pebble-bed high-temperature gas reactor (HTGR) and is scaled as a “four-pack” for 320 MWe
- DOE selected X-energy in 2020 to receive up to $1.2 billion under the Advanced Reactor Demonstration Program (ARDP) in cost-shared funding to demonstrate an advanced reactor and a TRISO-X fuel fabrication facility
- X-energy/Dow submitted construction permit application to NRC in March 2025; NRC is reviewing the application and set an 18-month schedule

Donald J. Trump Advanced Energy and Intelligence Campus

- Led by Fermi America (co-founded by former Energy Secretary Rick Perry), in partnership with Texas Tech University
- Planned to host 11 gigawatts of energy infrastructure and 18 million square feet of AI computing capacity; located near Pantex Plant outside of Amarillo, TX
- Envisions a “hypergrid” integrating nuclear power, the nation’s largest combined-cycle natural gas project, solar power, utility grid power, and battery energy storage for redundant power delivery
- Plans include building four Westinghouse AP1000 advanced LWRs (with the potential for future SMRs) that will provide 4 GWe of power by 2032
- Fermi America submitted a combined construction permit and operating license (COL) application to the NRC on June 17, 2025

Texas Projects – ACU Research Reactor

- Abilene Christian University (ACU) is building a molten salt research reactor (MSRR), the first deployment of the Natura MSR-1, a 1-MW thermal graphite-moderated, molten fluoride salt research reactor
- ACU submitted a construction permit (CP) application August 2022. The NRC issued the CP on September 16, 2024
- Natura Resources brought together ACU's NEXT Lab with Texas A&M University, The University of Texas at Austin and Georgia Institute of Technology to form the NEXT Research Alliance
- Natura and ACU are completing design work and aiming to submit an operating license application in 2025; construction work has started

Texas Projects – Texas A&M RELLIS Campus

- The Texas A&M University System is planning to develop a "Nuclear Energy Proving Ground" at the RELLIS Campus in Bryan, TX, with the goal of testing and deploying advanced SMRs
- Project involves partnering with four companies: Kairos Power, Natura Resources, Terrestrial Energy, and Aalo Atomics, to potentially bring SMRs to the campus within five years
- Campus is being prepared to host a diverse range of SMR technologies (from ~10 MWe microreactors up to ~300 MWe modules), with a combined potential output exceeding 1 GWe
- Project aims to connect the reactors to the ERCOT grid, contributing to the state's overall power supply, with initial operations of the reactors projected for the early to mid-2030s

Texas Projects – Terrestrial Energy

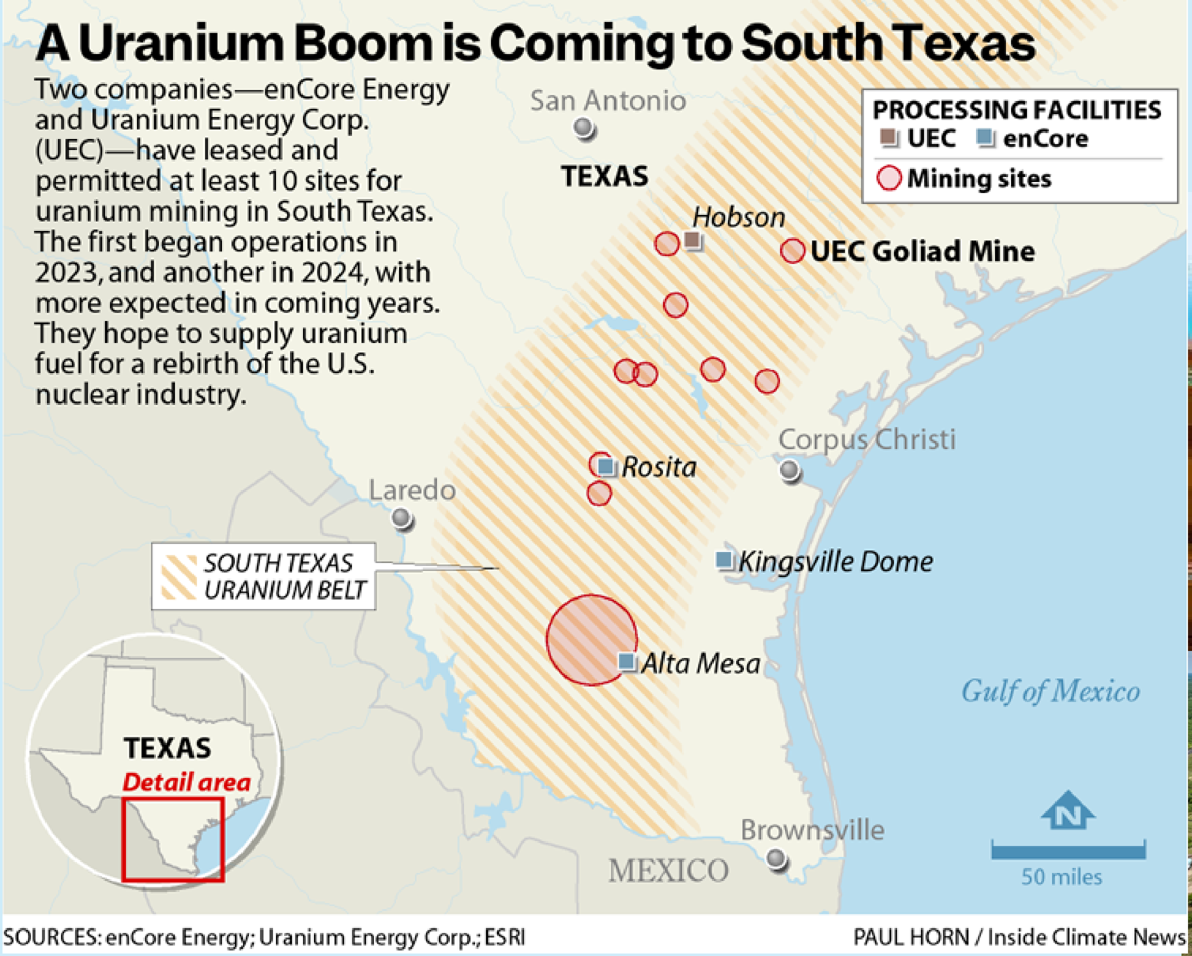
- Terrestrial Energy is seeking to license and build its Integral Molten Salt Reactor (IMSR) technology to supply zero-carbon, reliable, dispatchable, high-temperature industrial heat and electricity
- The company's two-unit configuration can deliver 390 MWe
- Terrestrial and Numerical Advisory Solutions (Zachary Group) recently signed an MOU to collaborate on IMSR site evaluation, plant development, and project deployment, **with a focus on Texas sites**
- Terrestrial has been engaged in preapplication activities with the NRC since 2020 and has made significance progress in Canada under the Canadian regulator's vendor design review process

Texas Projects – Permian Basin

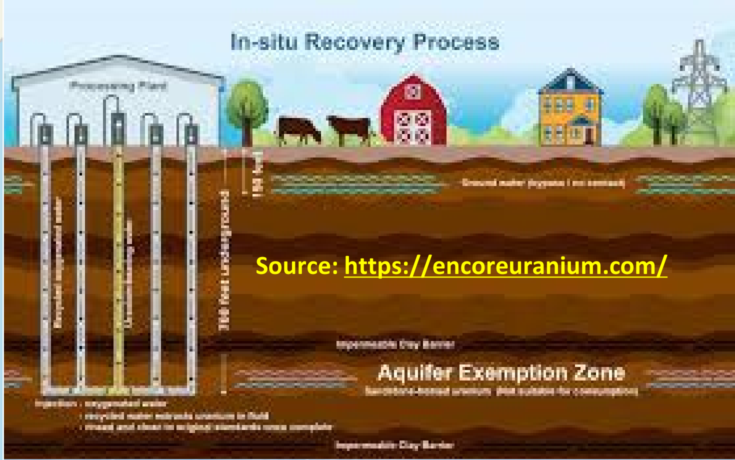
- Oil and gas sector is exploring the possible use of microreactors to support power and heat needs in the Permian Basin and other areas
- Working with NEI and nuclear technology company BWXT, Houston-based NOV Shepherd Power has engaged the NRC on its business model and associated licensing/deployment considerations
- In April 2024, Oklo and Diamondback Energy agreed to explore a long-term PPA that would supply Diamondback's Permian Basin operations with power from Oklo's proposed 50 MWe micro-reactors
- In July 2024, Natura Resources entered a partnership with the Texas Produced Water Consortium at Texas Tech to look at the deployment of Natura's MSR technology in the Permian Basin

Texas Projects – Uranium Mining

- Texas is experiencing a significant increase in uranium mining activities, primarily in the South Texas Uranium Province (Karnes, Bee, Goliad, and Duval Counties); includes both reactivated and newly-permitted projects
- In-situ recovery (ISR) mining is the preferred method for extracting uranium from deeper deposits. Solvents are injected underground to dissolve uranium, and the resulting slurry is pumped back up for processing
- enCore Energy started production at two South Texas sites in 2023 and 2024, with plans for four more by 2027; the company reported high uranium extraction rates in June 2025 at the Alta Mesa ISR Uranium Central Processing Plant (CPP) and resumed operations at the Rosita CPP in November 2023; also developing the Upper Spring Creek and other projects
- Uranium Energy Corporation holds five sites in South Texas, including the Goliad mine, Burke Hollow, Palangana, and plans to resume operations in 2025



https://www.texasstandard.org/stories/texas-uranium-mining-nuclear-reactors/



Source: https://encoreuranium.com/

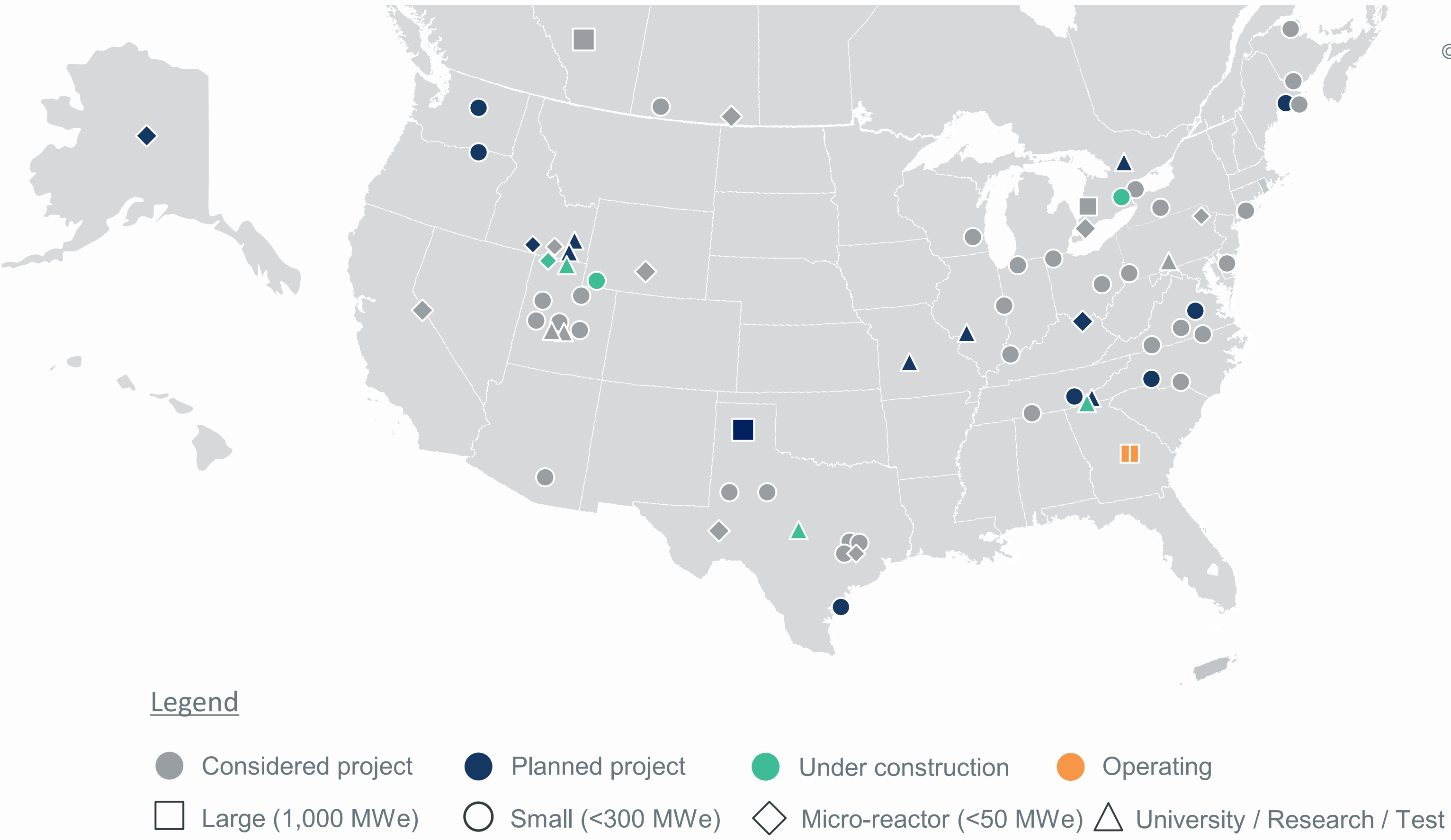
Source: https://encoreuranium.com/

North American Advanced Nuclear Deployment Plans

Projects that may be in operation by early 2030s

Updated 07/08/2025

Does not include plans for more than 12 additional projects that have not announced site locations.



New Vogtle Units 3 & 4 in Waynesboro, GA

Two Westinghouse AP-1000 Reactors – 1100 MW(e) each

Southern Nuclear is the NRC-licensed operator

Unit 3 entered commercial operations in July 2023; Unit 4 did so in April 2024

First new power reactors built in U.S. in decades

Four AP-1000 units operating in China; more being built

Advanced Reactor Dashboard | Project List (57)

Updated 07/03/2025

Status	Country	State	Plant/Project Name	Model	# Units	Total Capacity (MWe)	Owner
Operating	United States	Georgia	Vogtle 3 & 4	AP1000	2	2,200.0	Georgia Power Co
Under Construction	United States	Tennessee	Hermes Demonstration Plant	KP-FHR	1	140.0	Kairos Power
Under Construction	United States	Wyoming	Natrium Demonstration Project	Natrium	1	345.0	Rocky Mountain Power
Planned	United States	Idaho	Radiant Demonstration	Kaleidos	1	1.2	
Planned	United States	Texas	ACU Research Reactor	MSR-1	1	0.3	Abilene Christian University
Planned	United States	Virginia	Gladstone Joshua Falls Project	Unspecified small reactor	1	0.0	Appalachian Power
Planned	United States	Texas	Project Long Mott	Xe-100	4	330.0	Dow Chemical
Planned	United States	Texas	Donald J. Trump Advanced Energy and Intelligence Campus	AP1000	4	4,400.0	Fermi America
Planned	United States	Tennessee	Hermes Demonstration Plant 2	KP-FHR	2	280.0	Kairos Power
Planned	United States	Idaho	Oklo Aurora Demonstration Reactor	Aurora Powerhouse	1	15.5	Oklo
Planned	United States	Ohio	Standard Power Ohio Project	VOYGR-12	1	924.0	Standard Power
Planned	United States	Pennsylvania	Standard Power Pennsylvania Project	VOYGR-12	1	924.0	Standard Power
Planned	United States	Tennessee	Clinch River Project	BWRX-300	4	1,200.0	Tennessee Valley Authority
Planned	United States	Alaska	Eielson AFB Microreactor	Aurora Powerhouse	1	15.5	U.S. Air Force
Planned	United States	Idaho	Project Pele	BANR	1	17.0	U.S. Department of Defense Strategic Capabilities Office
Planned	United States	Illinois	University of Illinois Research Reactor	KRONOS MMR	1	15.0	University of Illinois
Planned	United States	Idaho	eVinci Demonstration	eVinci	1	5.0	Westinghouse
Proposed	United States	Texas	Shepherd Power	eVinci	0	0.0	
Proposed	United States	Texas	Fortifying the Future Partnership: Natura & TxPWC	MSR-1	0	0.0	
Proposed	United States	Texas	Last Energy Data Center Project	PWR-20	30	600.0	
Proposed	United States	Utah	Holtec-Mountain West	SMR-300	13	4,000.0	
Total					**466**	**33,105.9**	

U.S. Advanced Reactor Projects

Note: Partial list of U.S. projects. See NEI Advanced Reactor Dashboard for full list.

NEI NUCLEAR ENERGY INSTITUTE

Advanced Reactor Dashboard | Project List

Status	Country	State	Plant/Project Name	Model	# Units	Total Capacity (MWe)
Planned	Canada	Ontario	Nano Nuclear Chalk River Demonstration	KRONOS MMR	1	15.0
Planned	Canada	Ontario	OPG Darlington Expansion	BWRX-300	4	1,200.0
Proposed	Canada	Ontario	Bruce Power eVinci	eVinci	1	5.0
Proposed	Canada	Ontario	Bruce C LLWR	Unspecified large reactor	4	0.0
Proposed	Canada	Alberta	Peace River Nuclear Power Project	MONARK	2	2,000.0
Proposed	Canada	New Brunswick	NB Power ARC reactor	ARC-100	1	100.0
Proposed	Canada	New Brunswick	NB Power Moltex reactor	SSR-W	1	300.0
Proposed	Canada	New Brunswick	New Brunswick Tribal Council SMR	AP300	1	330.0
Proposed	Canada	Ontario	OPG Port Hope LLWR	Unspecified large reactor	1	0.0
Proposed	Canada	Saskatchewan	Sask Research Council eVinci Test Reactor	eVinci	1	5.0
Proposed	Canada	Saskatchewan	SaskPower SMRs	BWRX-300	4	1,200.0
Proposed	Canada	New Brunswick	Westinghouse-Pabineau-Eel River Bar First Nations	AP300	1	330.0

Canadian Advanced Reactor Projects

Source: NEI Advanced Reactor Dashboard

Advanced Reactor Vendor Progress

NEI

	Pre-Application	Under Review	Under Construction	Operating
Test Reactors			Kairos Power Hermes Kairos Power Hermes2 Natura Resources SUSTAINABLE ENERGY	
Micro Reactors	LAST ENERGY Westinghouse NANO Nuclear Energy Inc. DEEP FISSION OKLO Aalo RADIANT Hadron Energy X energy TERRA INNOVATUM SOLO GENERAL ATOMICS		BWXT BWX Technologies, Inc.	
Power Reactors	TerraPower TERRESTRIAL ENERGY GE HITACHI GENERAL ATOMICS arc CLEAN TECHNOLOGY Westinghouse HOLTEC INTERNATIONAL DEEP FISSION ROLLS ROYCE SMR	X energy NUSCALE Power for all humankind TerraPower		

Progress Being Made

Updated June 2025

Licensing Progress

		Pre-Application	Under Review	NRC Approval	In Operations
Part 50	CP	University of Illinois Urbana-Champaign; Reploy Power; Blue Energy; Shepherd Power	X-energy Long Mott; GE Hitachi Clinch River; TerraPower Kemmerer	Kairos Power Hermes; Kairos Power Hermes2; Abilene Christian University	
	OL				
Part 52	ESP	Appalachian Power (An AEP Company); RELLIS The Texas A&M University System; Duke Energy			
	DC/SDA			NuScale (Power for all humankind)	
	COL				

Updated June 2025

Advanced Reactor Licensing Progress

NEI

Approved

- NUSCALE Power for all humankind
- NUSCALE Power for all humankind
- Kairos Power
- Natura Resources
- Kairos Power

Under Review

- TerraPower
- X energy®
- GE HITACHI

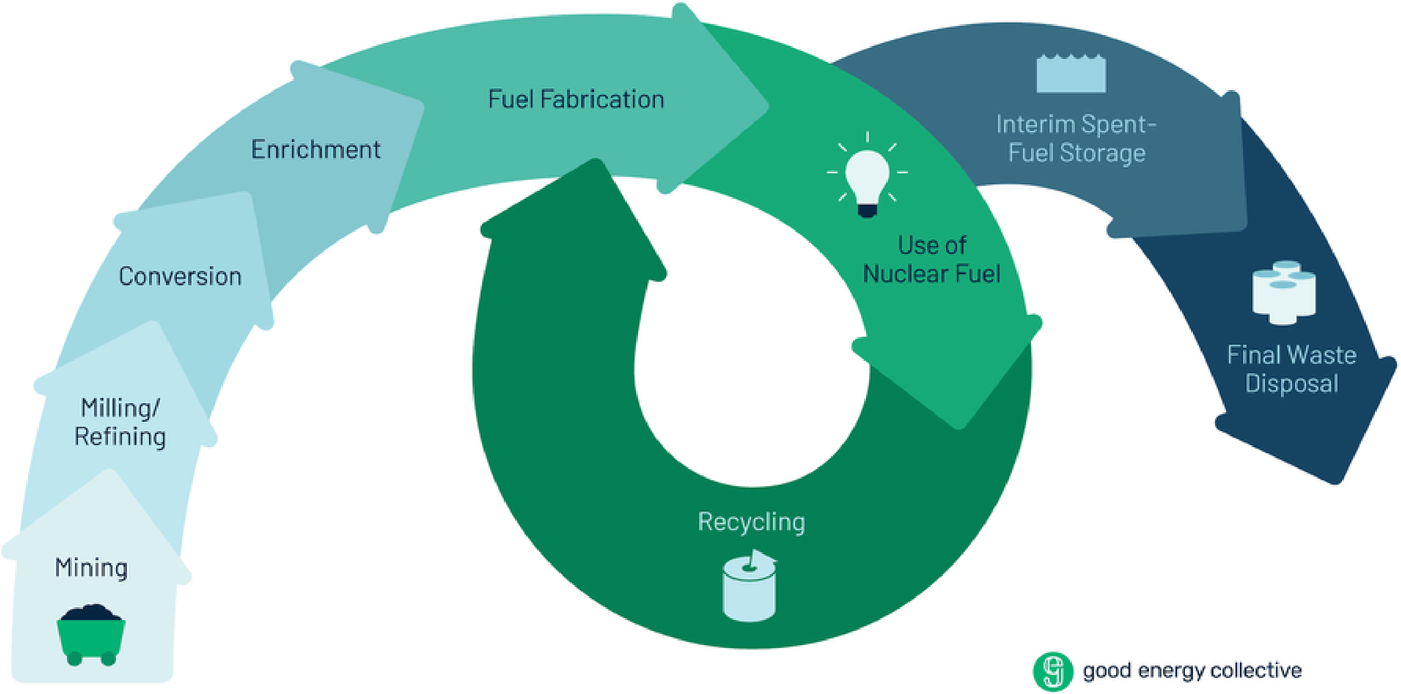
Pre-Application

- Aalo
- arc CLEAN TECHNOLOGY
- DEEP FISSION
- GENERAL ATOMICS
- GENERAL ATOMICS
- HOLTEC INTERNATIONAL
- Kairos Power
- LAST ENERGY
- Natura Resources
- NANO Nuclear Energy Inc.
- OKLO
- RADIANT
- TERRESTRIAL ENERGY
- TerraPower
- TERRA INNOVATUM SOLO
- Westinghouse
- Westinghouse

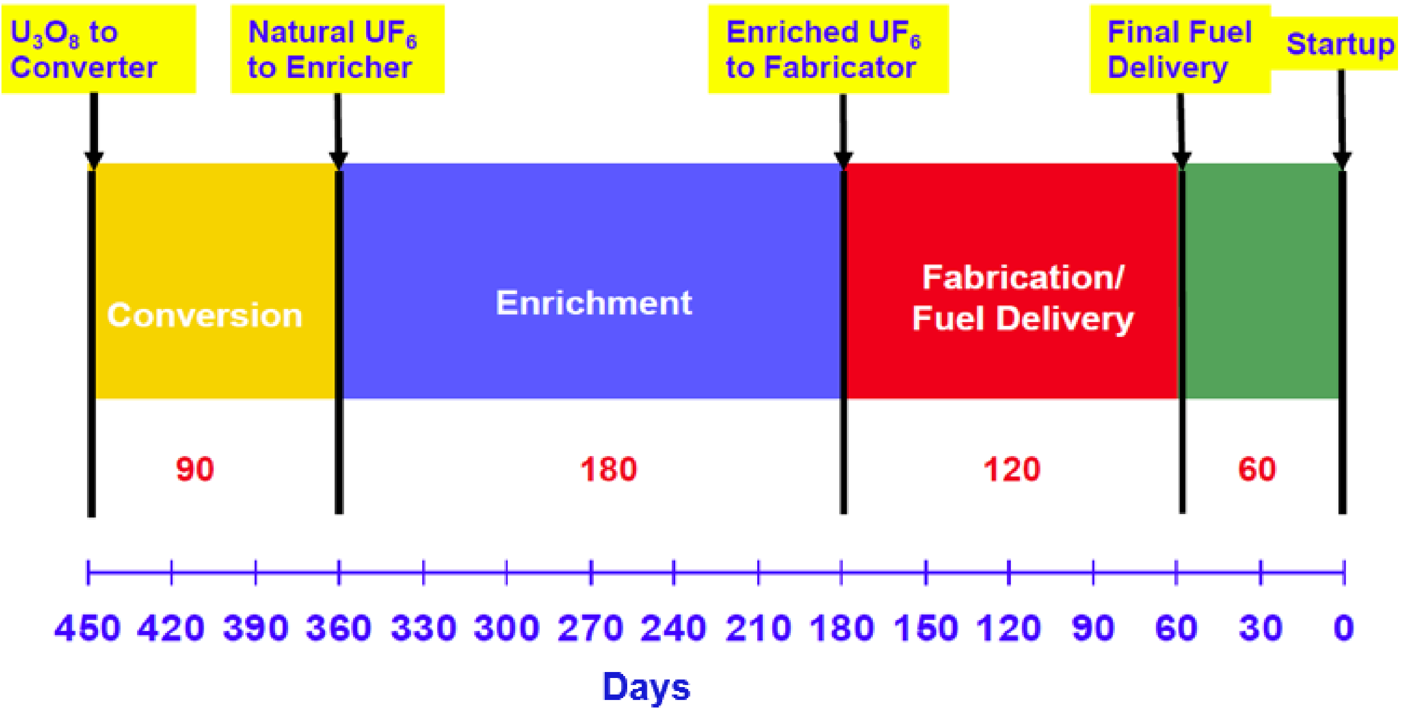
Updated 06/05/2025

Construction Progress

The Nuclear Fuel Cycle

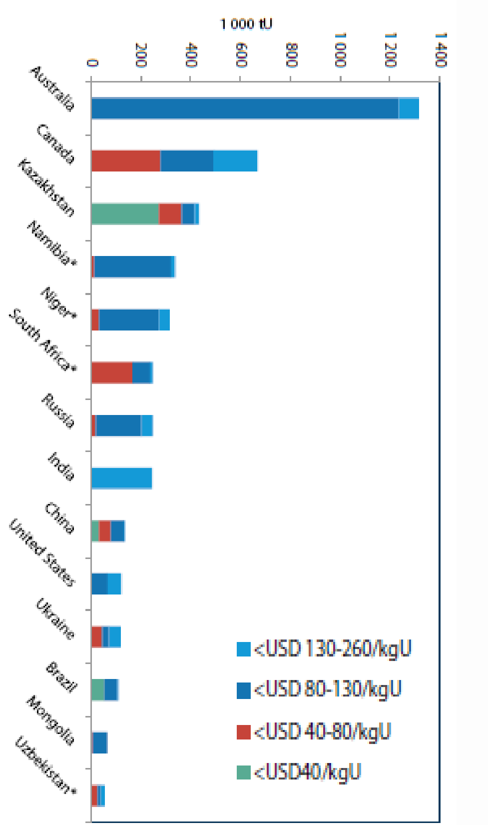


Fuel Procurement is a Long-Term Process



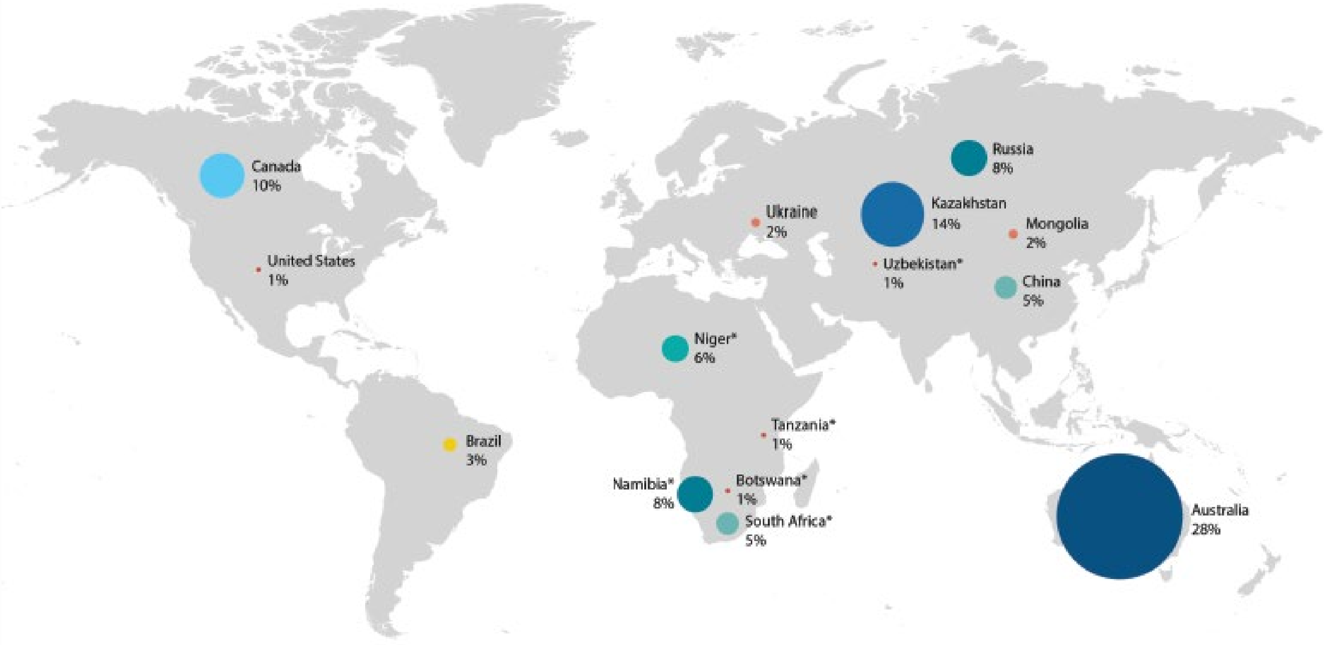
Global Uranium Resources

Uranium 2024 NEA No. 7683

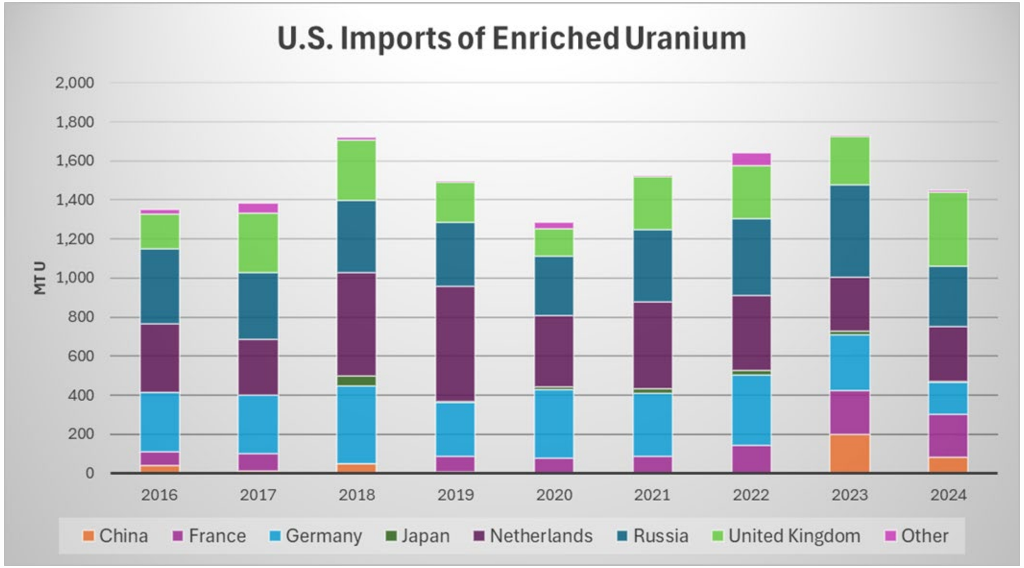


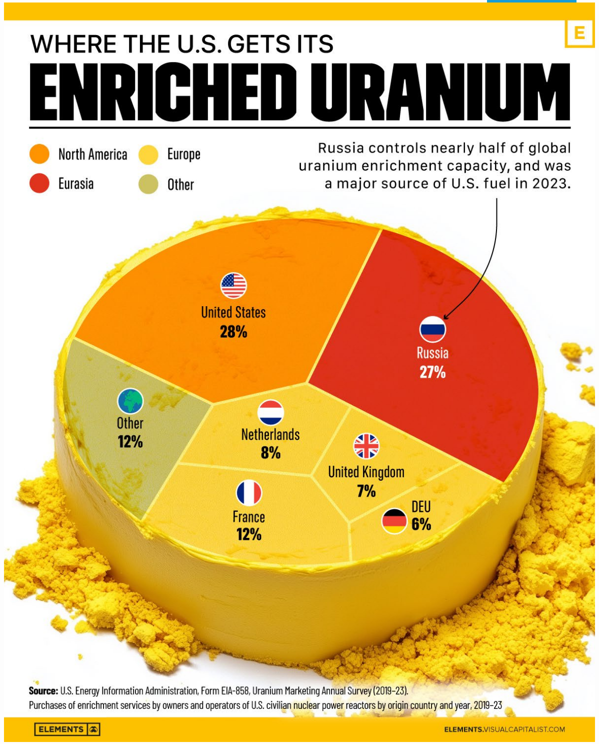
Reasonably Assured Recoverable Conventional Uranium Resources

Resources <$130/lb as of January 1, 2023



U.S. Uranium Imports

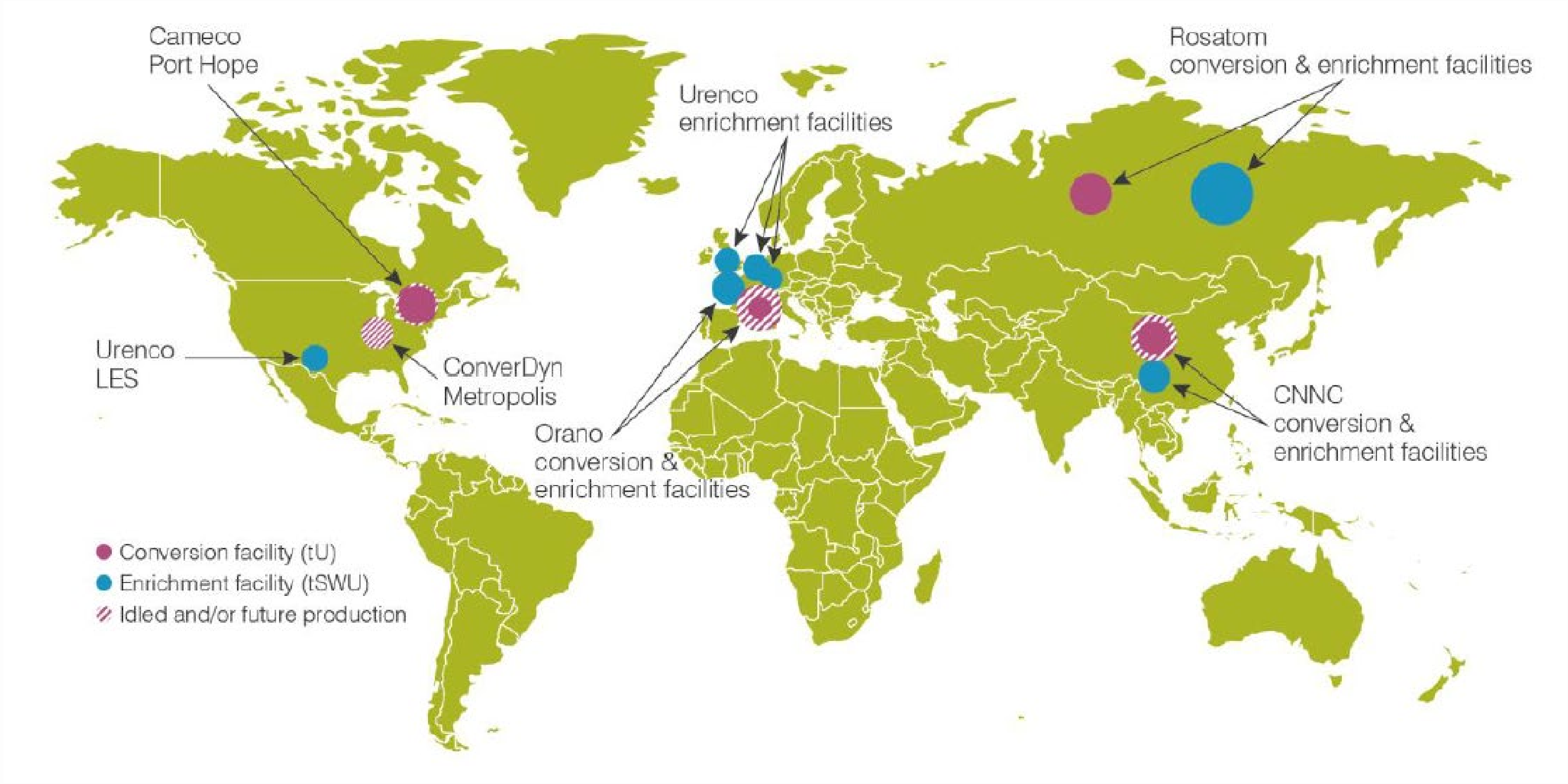




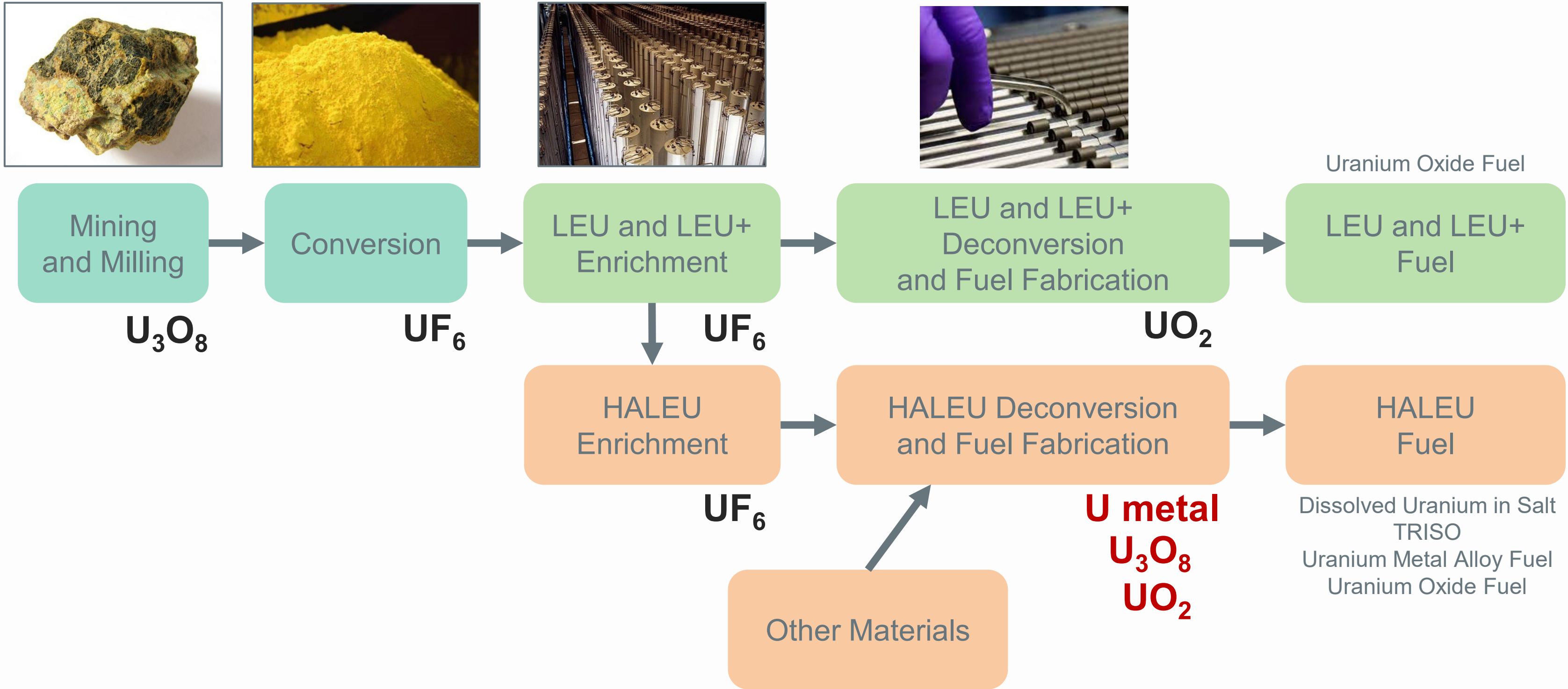
Source: Elements Jan. 2025

Russia provides approximately 20% of U.S. EUP imports and controls 40% of the world's enrichment capacity

Conversion & Enrichment Supply



Expanding the Fuel Cycle



U.S. Needs for Increased Enrichments

- Existing fleet
  - Between 5% and 10%
  - Extending burnup and time between outages
  - Confident in pathway for enrichment and transportation
- Advanced reactors
  - Between 10% and 20% (HALEU)
  - Needed by most but not all advanced non-LWR reactors and some advanced fuels for existing fleet
  - Enrichment, deconversion, and transportation challenges
  - Russia is primary commercial source of HALEU

Source: https://www.nei.org/resources/reports-briefs/establishing-a-haleu-infrastructure-for-advanced-r

https://www.nei.org/advanced-nuclear-energy