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# The Case for Nuclear Power – technological solutions to meet increased demand

*Senate Presidents Forum  
Amelia Island, Florida*

Battelle Energy Alliance manages INL for the  
U.S. Department of Energy's Office of Nuclear Energy

**INL** Idaho National Laboratory

# Objectives – Answer the following questions

- Who am I and where do I work?
- Why do we need more nuclear energy?
- What are some of the key actions in the last year at the Federal level?
- So what is happening?
- What are states doing in the nuclear energy space?
- Q&A

# DOE National Laboratories



# INL's Heritage: *The National Reactor Testing Station drove nuclear innovation in the U.S. and around the world*

**1st**

Nuclear power plant

U.S. city to be powered by nuclear energy

Submarine reactor tested; training of nearly 40,000 reactor operators until mid-1990s

Mobile nuclear power plant for the army

Demonstration of self-sustaining fuel cycle

Basis for LWR reactor safety

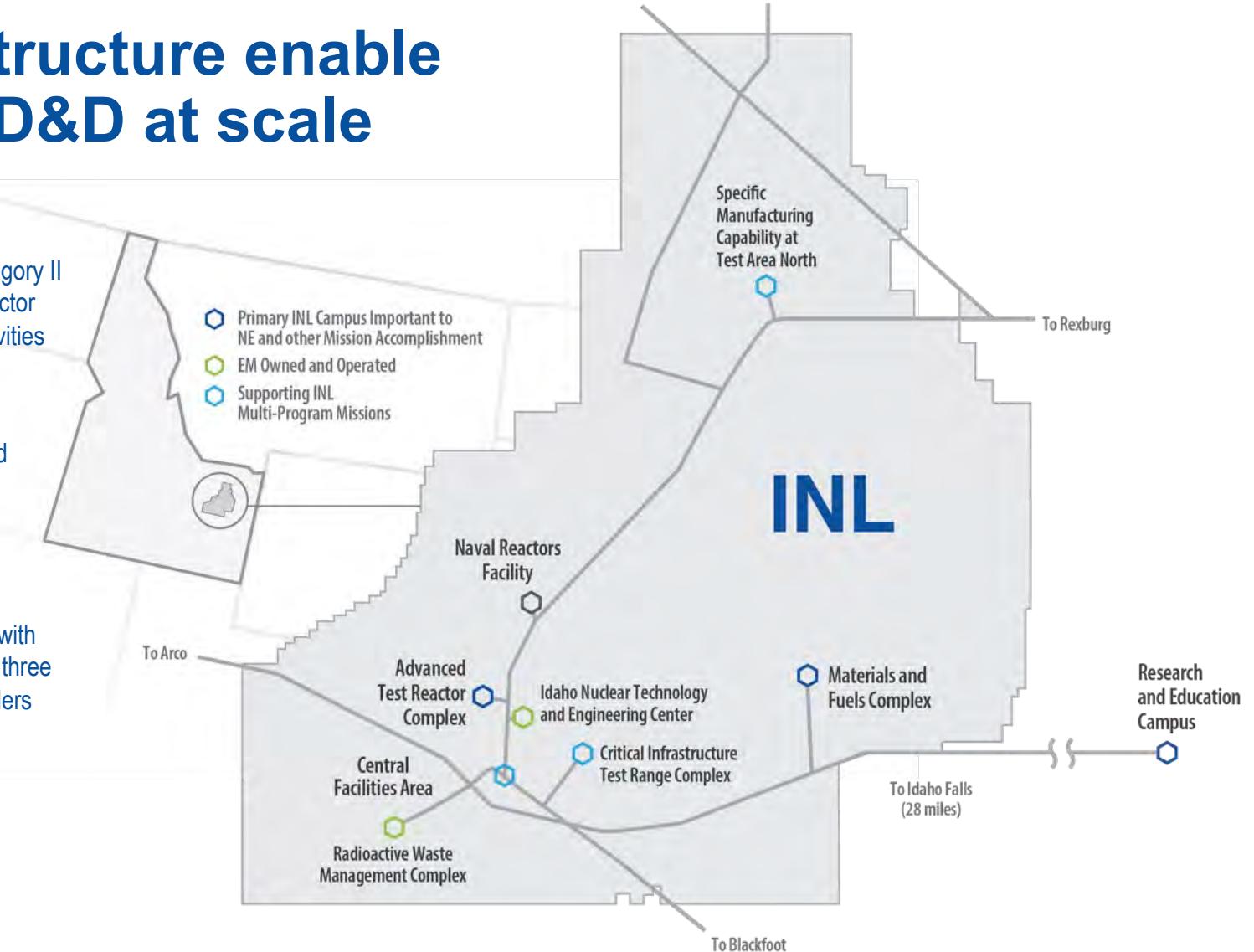
Aircraft and aerospace reactor testing

Materials testing reactors



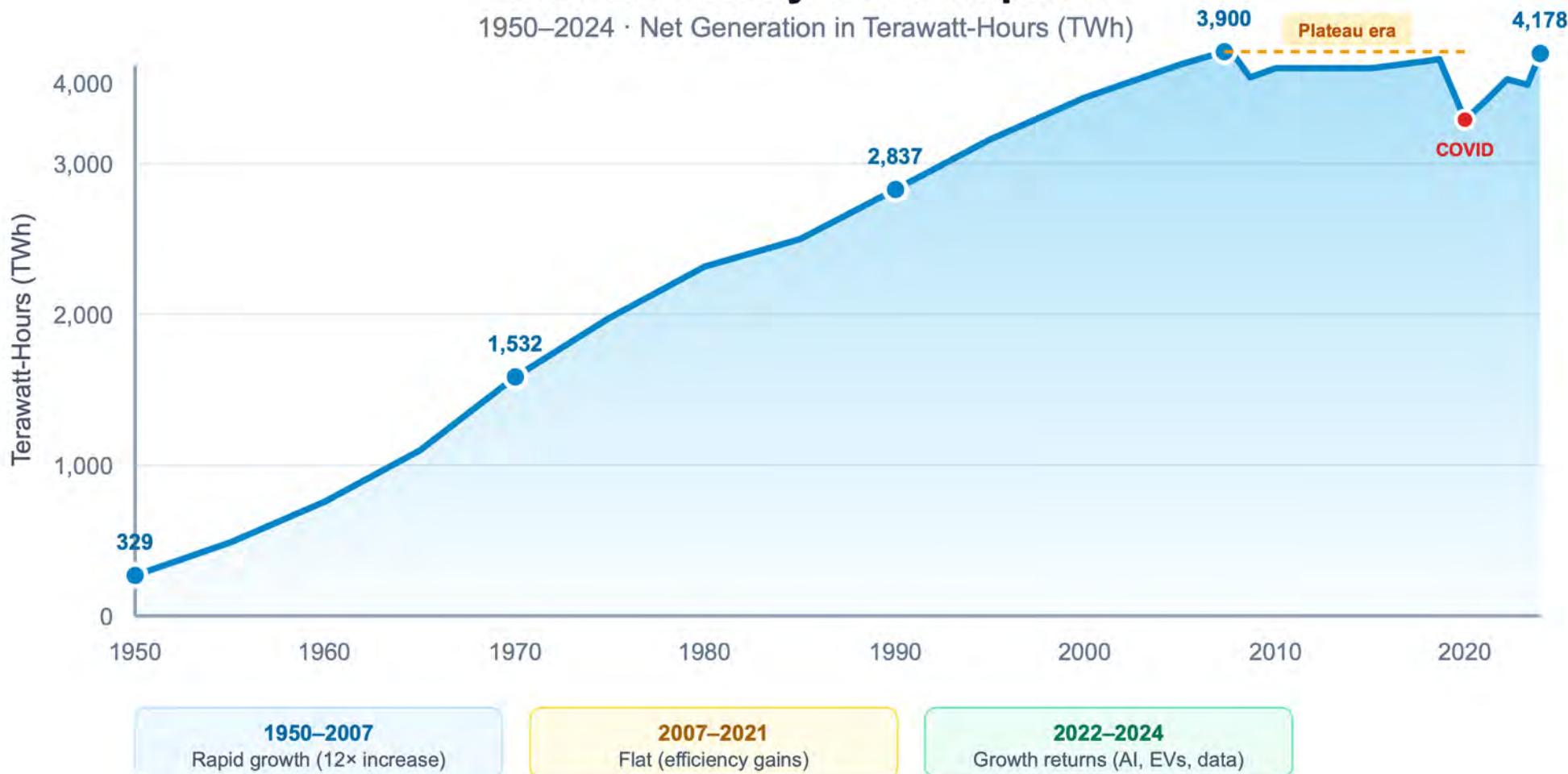
# Unique site and infrastructure enable energy and security RD&D at scale

- 4 Operating reactors
- 22 Hazard Category II & III non-reactor facilities/activities
- 49 Radiological facilities/activities
- 17.5 Miles railroad for shipping nuclear fuel
- 144 Miles high-voltage transmission & distribution lines
- 44 Miles primary roads (125 miles total)
- 3 Fire Stations



# U.S. Electricity Consumption

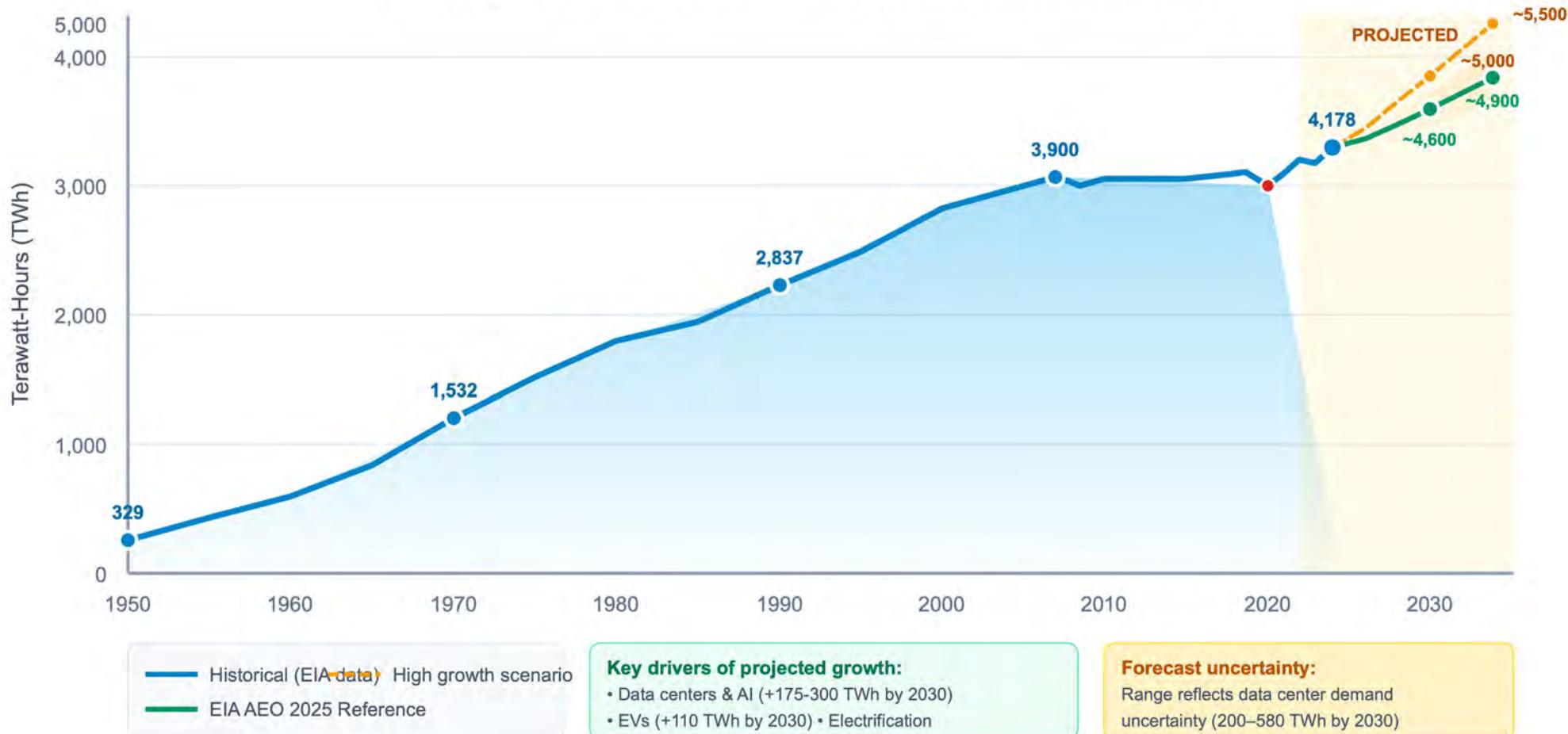
1950–2024 · Net Generation in Terawatt-Hours (TWh)



Source: U.S. Energy Information Administration (EIA)

# U.S. Electricity Consumption: Historical & Projected

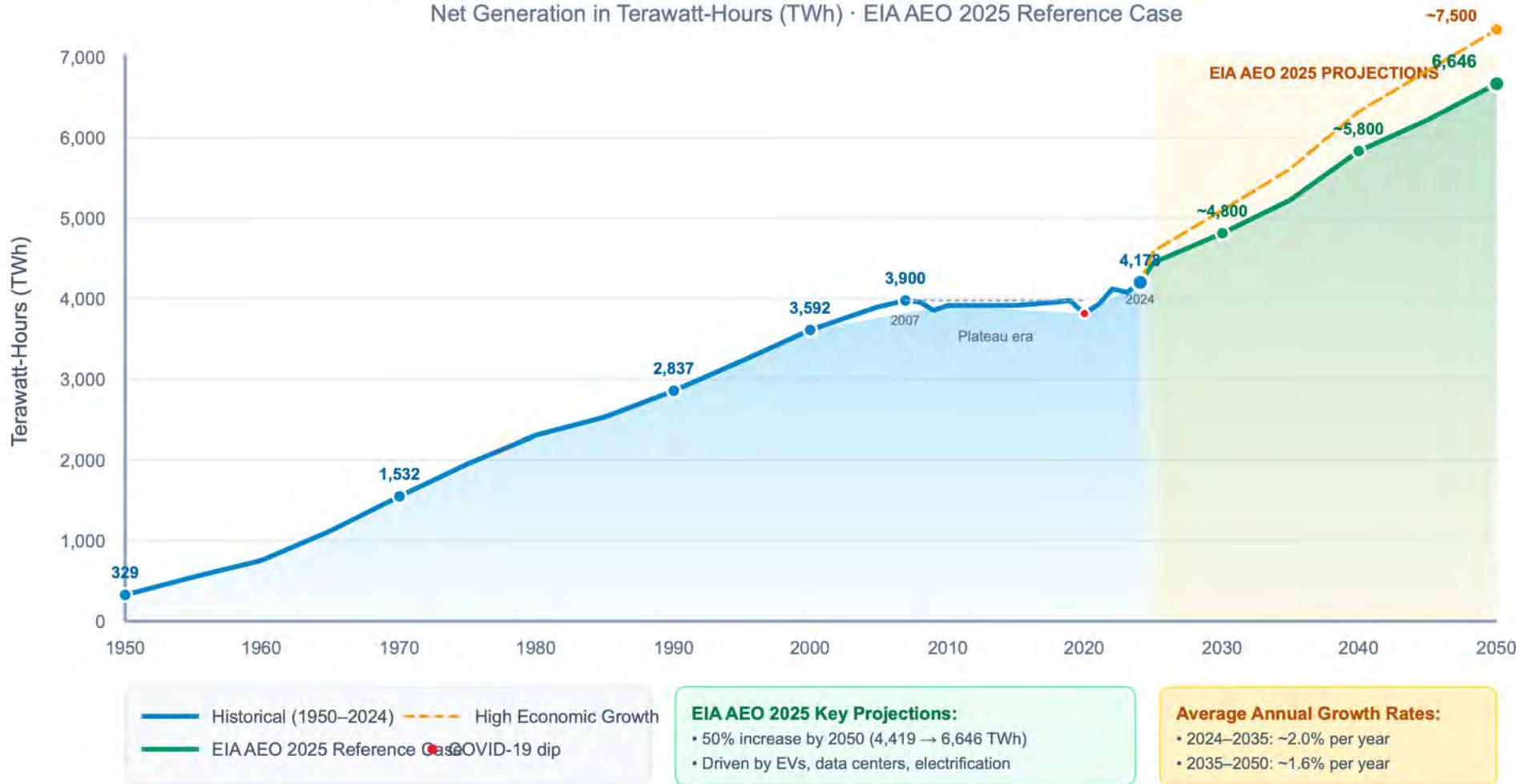
1950–2035 · Net Generation/Consumption in Terawatt-Hours (TWh)



Sources: EIA Monthly Energy Review, AEO 2025, STEO; Rystad Energy; DOE; IEA

# U.S. Electricity: Historical & Projected to 2050

Net Generation in Terawatt-Hours (TWh) · EIA AEO 2025 Reference Case



Sources: EIA Monthly Energy Review, Annual Energy Outlook 2025



## Nuclear Energy Executive Orders

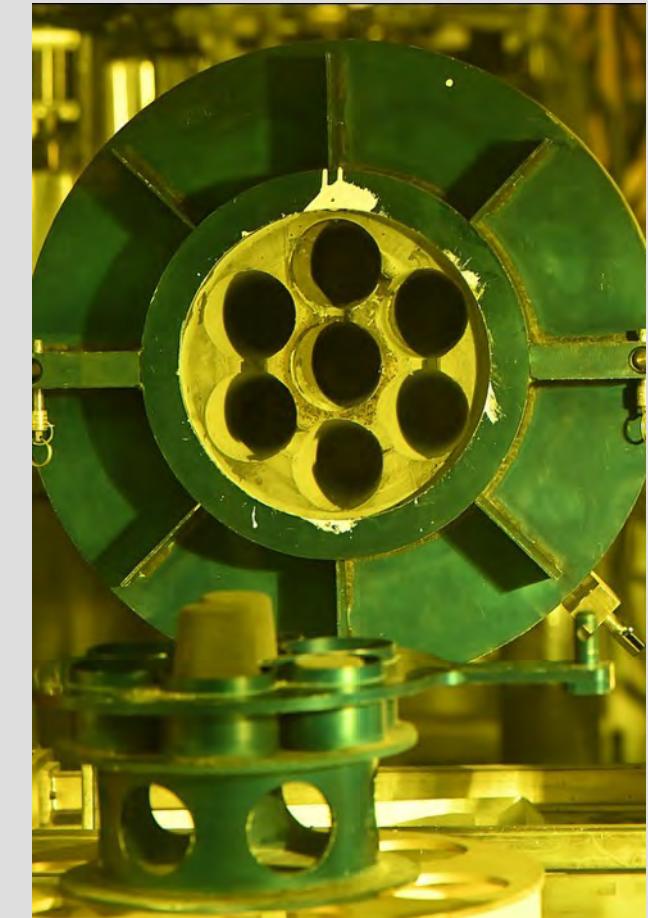
- Reinvigorate the Nuclear Industrial Base
- Reform Nuclear Reactor Testing at DOE
- Deploy Advanced Nuclear Reactor Technologies for National Security
- Reform the Nuclear Regulatory Commission

President Donald Trump holds up a signed executive order in the Oval Office of the White House May 23, 2017 in Washington, DC. Win McNamee/Getty Images

# Reinvigorate the Nuclear Industrial Base

- Strengthen the Domestic Nuclear Fuel Cycle
  - Reports on recycling and waste management, and domestic uranium
  - Expand conversion and enrichment capabilities
  - Halt Pu dilute and dispose and establish a program to make available to industry
  - Update uranium management policy and prioritize fuel fabrication facilities to supply test reactor fuel
- **Funding for restart, completion, uprate or construction of nuclear plants (5GW uprates, 10 new large reactors by 2030)**
- Grow Nuclear Workforce
  - Perform gap analysis of apprenticeship programs
  - Increase access to national labs

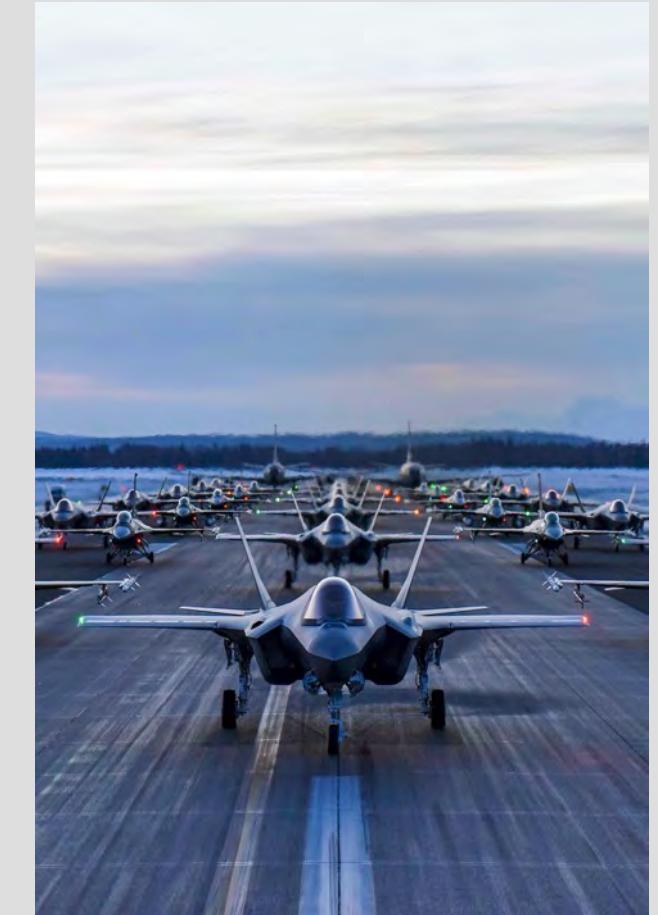
Executive Order 14302



# Deploy Advanced Nuclear Reactor Technologies For National Security

Executive Order 14299

- Deploy advanced nuclear reactors on military and DOE sites
- Release 20 metric tons of HALEU for any project on DOE sites powering AI and other infrastructure
- Interagency coordination and NEPA streamlining
- International engagement and exports - 123 Agreements – 20 by close of the 120<sup>th</sup> Congress



# Reform Nuclear Reactor Testing at Department of Energy

Executive Order 14301

- Define qualified test reactors and revise DOE and national laboratory requirements to “significantly expedite” deployment of advanced reactors
- **Establish a "pilot program" outside of national laboratories and approve of at least three reactors with the goal of achieving criticality by July 4, 2026**
- Streamline environmental reviews and reform DOE NEPA requirements



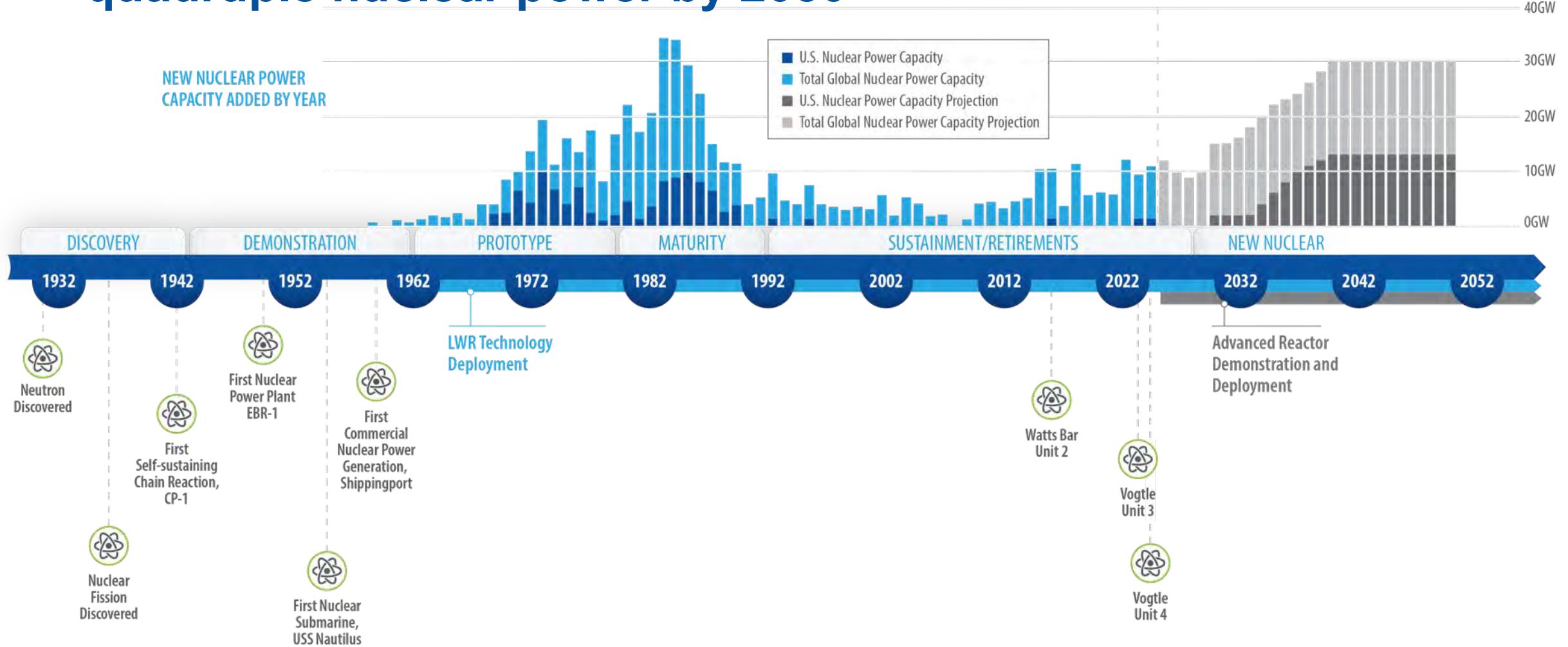
# Reform the Nuclear Regulatory Commission

Executive Order 14300

- **Reestablish U.S. nuclear leadership leading to a quadrupling of nuclear power by 2050**
- Reform culture and restructure NRC to increase availability of and innovation in nuclear
- Revise current NRC processes and regulations and establish "fixed deadlines"
- Reconsider linear no-threshold (LNT) model
- Credit DOE or DOD reactor reviews



# The past and future of nuclear power – what will it take to quadruple nuclear power by 2050





Vogtle Units  
3 & 4 are Producing  
**Clean, Reliable,  
Economic  
Power**



Russian  
Uranium Ban  
Unlocks **\$2.7B**  
for LEU  
an HALEU  
Production



**Bipartisan  
ADVANCE Act**  
Incentivizes and  
Supports New  
Nuclear



Microsoft  
Power Purchase  
Agreement enables  
the Launch of **Crane**  
**Clean Energy**  
**Center**



**Palisades Restart**  
Advanced by  
\$1.5B from the DOE  
Loan Program  
Office





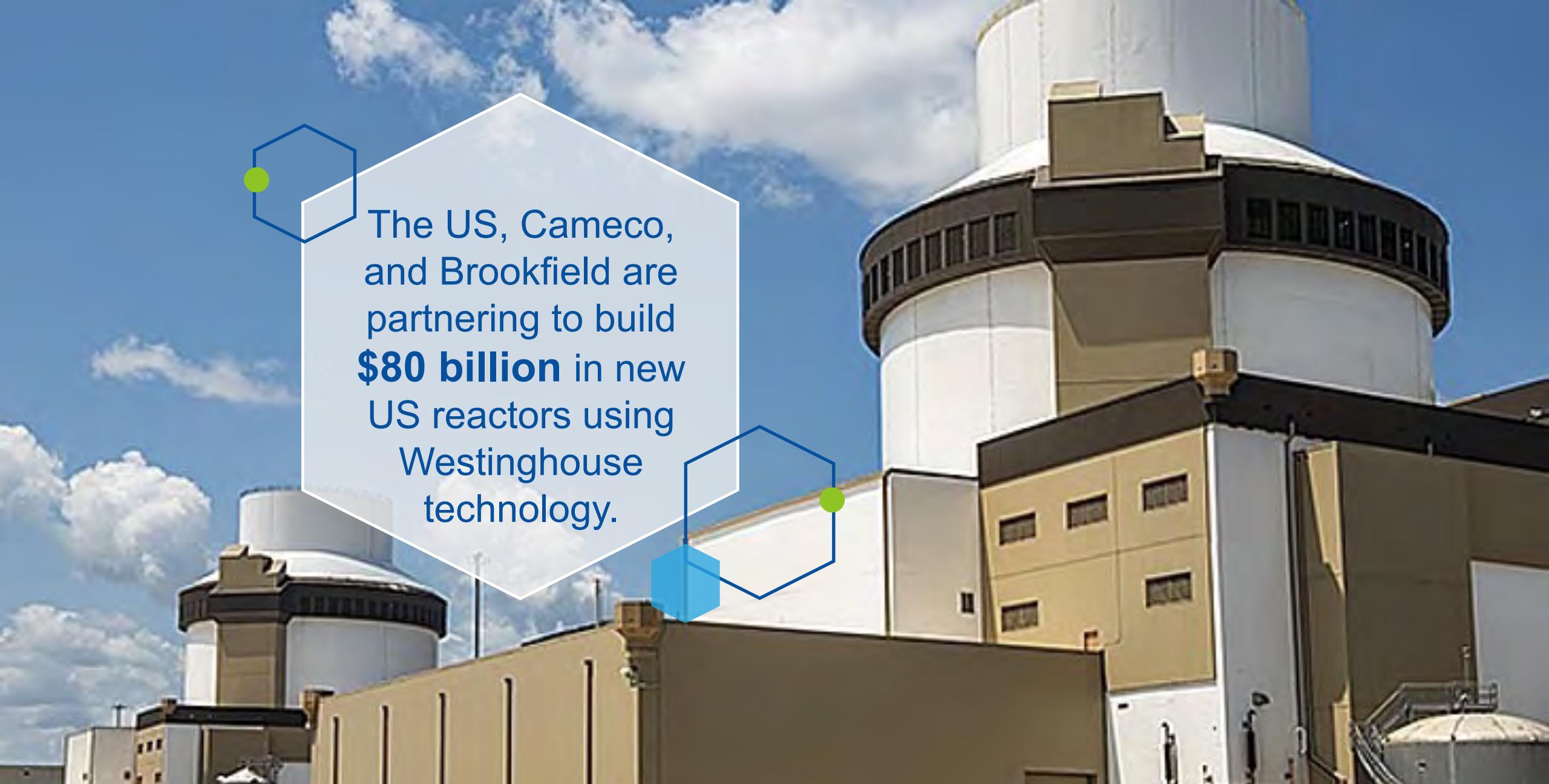
Partnership  
between Google  
and Kairos Will  
Enable up  
to **500 MW**  
**of SMRs**



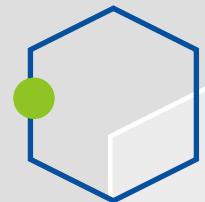
**X-Energy  
Secures \$500M  
in Financing from  
Amazon Climate  
Pledge Fund  
and Other Key  
Investors**



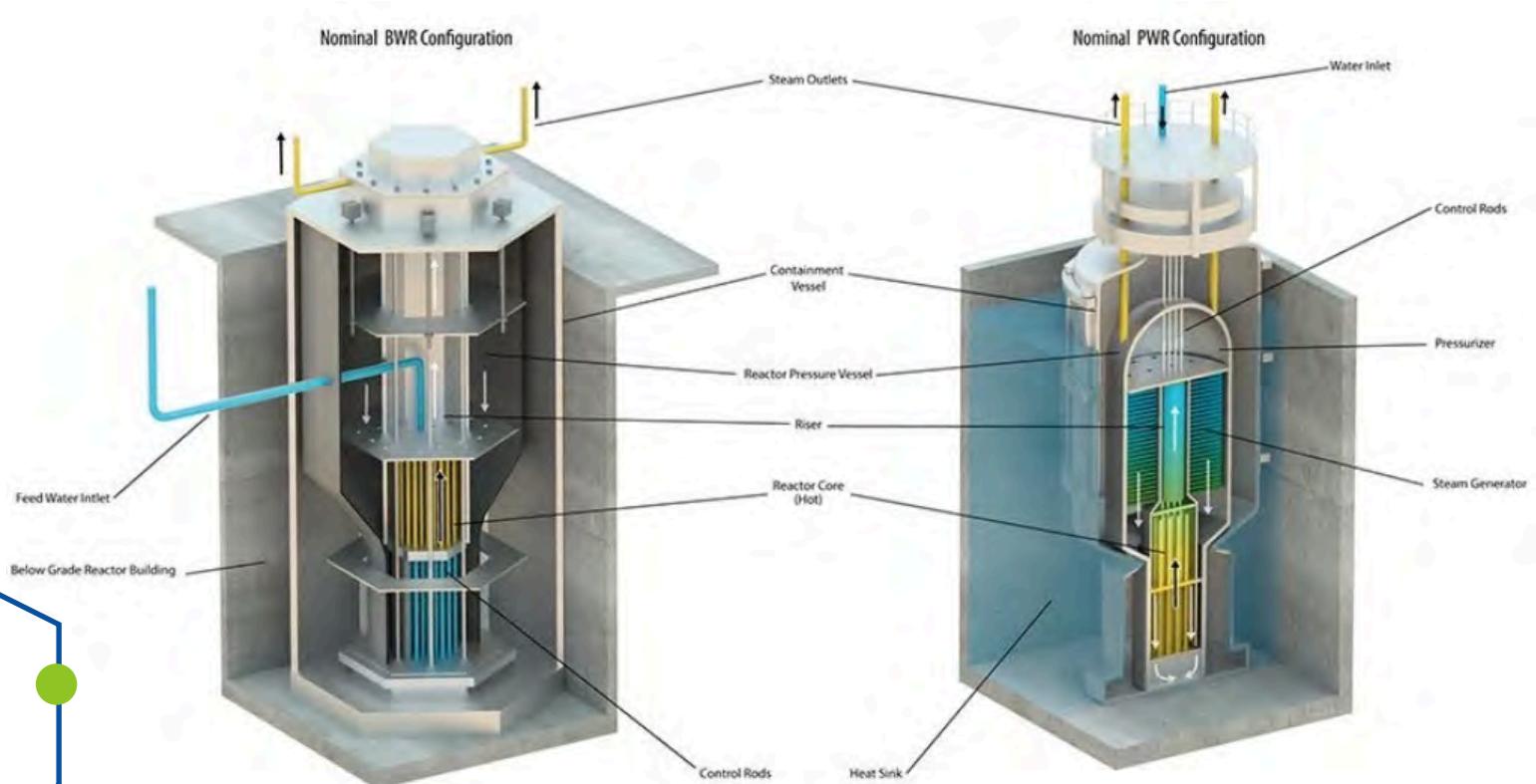
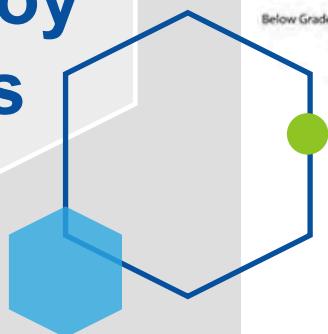
Ontario approved  
a **300 MW BWRX-  
300 SMR** by GE  
Vernova/Hitachi at  
Darlington, potentially  
the first “Western  
world” SMR.



The US, Cameco,  
and Brookfield are  
partnering to build  
**\$80 billion** in new  
US reactors using  
Westinghouse  
technology.

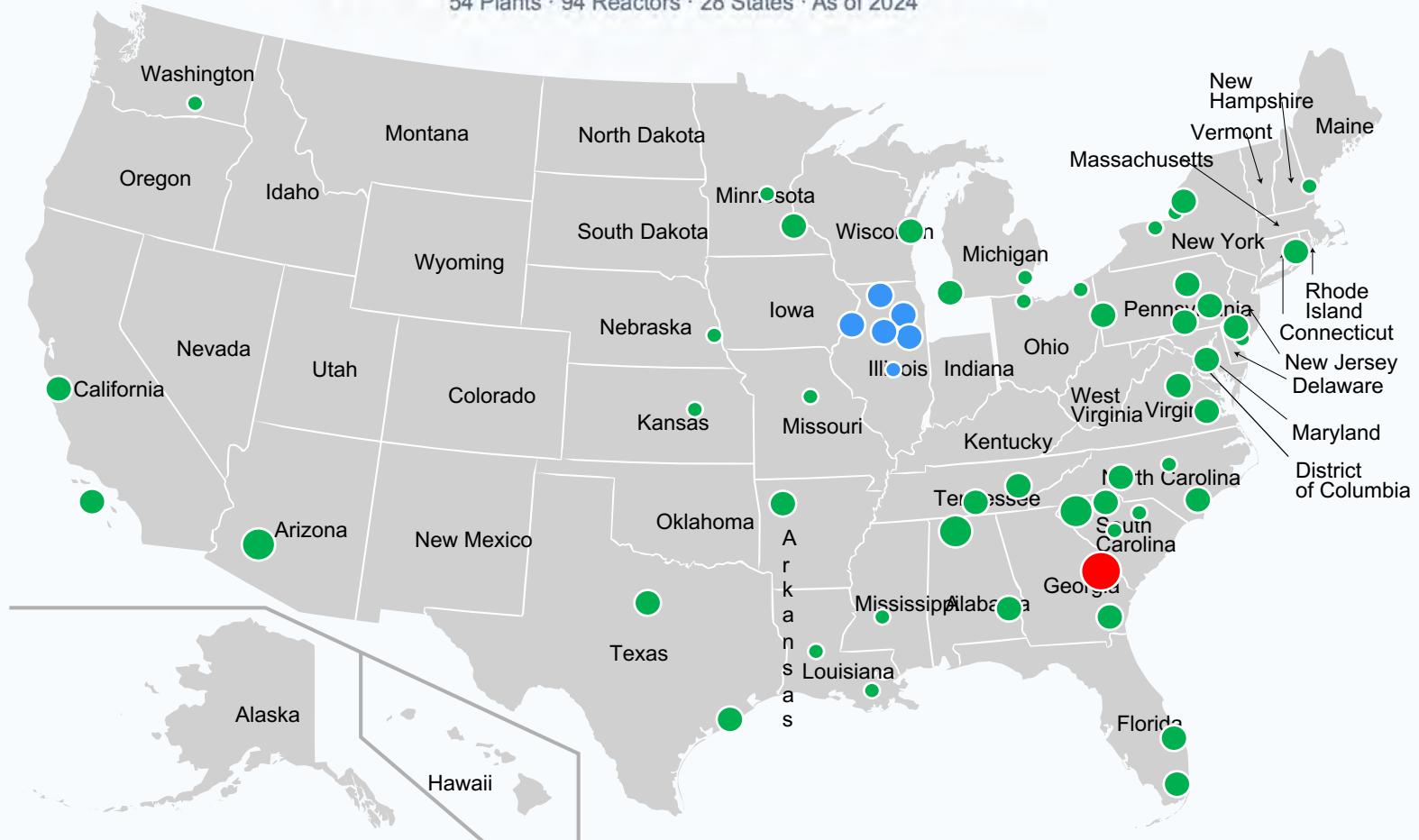


DOE-OCED  
and DOE-NE  
Open Applications  
for up to **\$900M** to  
**Build and Deploy**  
**Gen III+ SMRs**



# U.S. Operating Nuclear Power Reactors

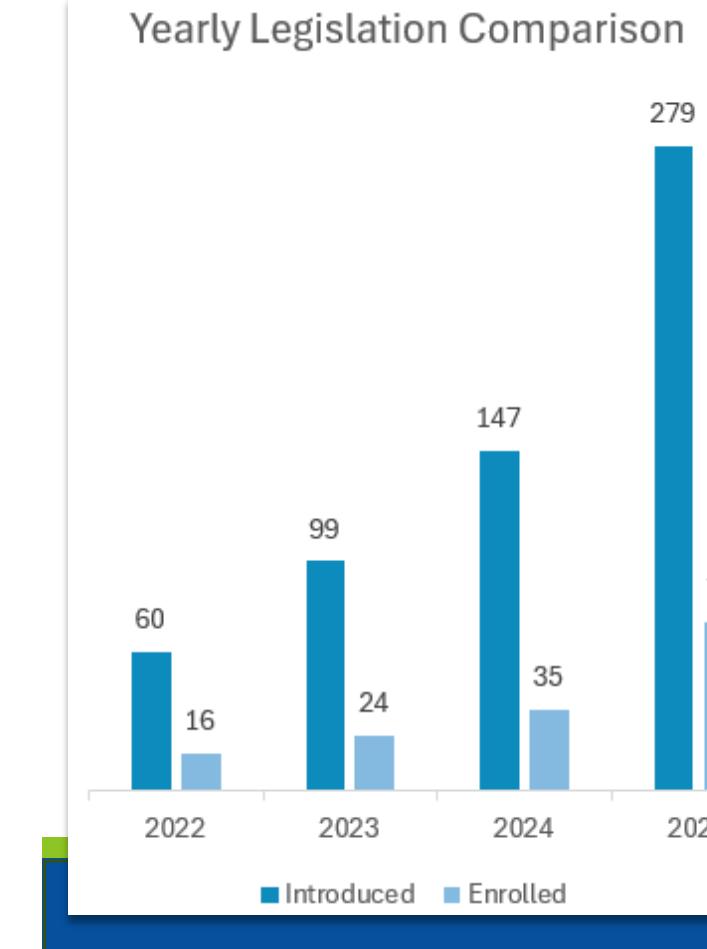
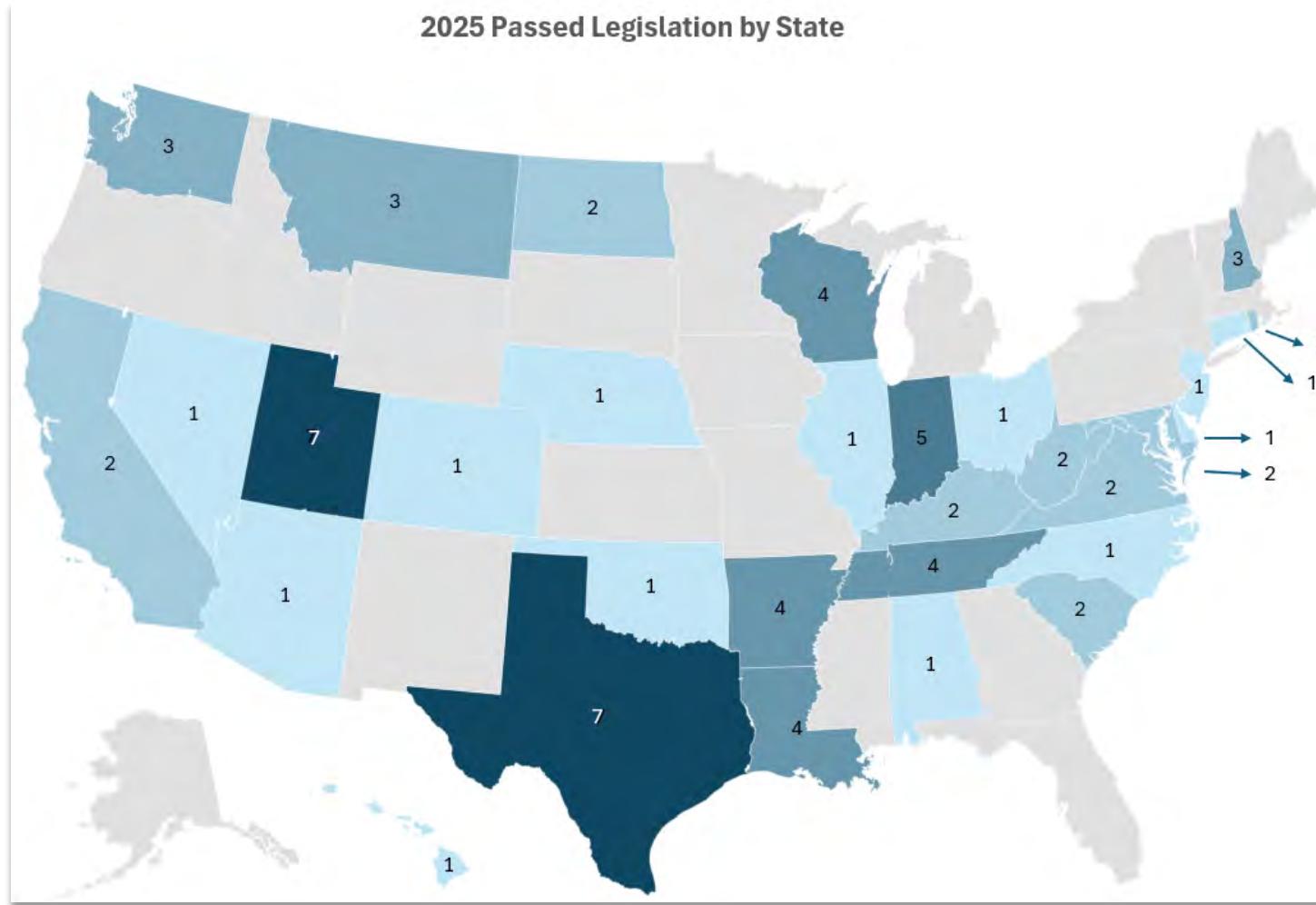
54 Plants · 94 Reactors · 28 States · As of 2024



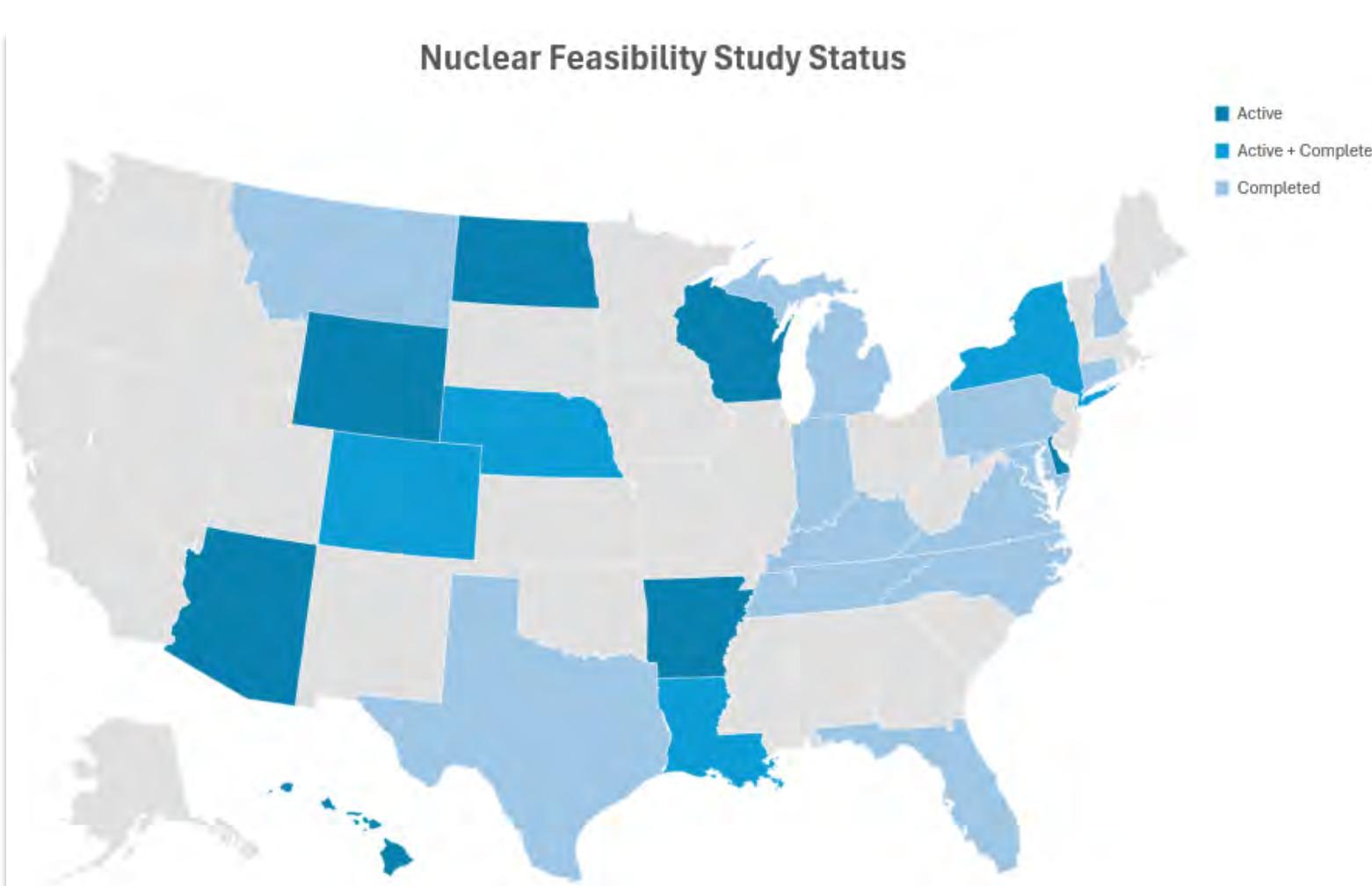
Source: NRC List of Power Reactor Units, 2025

# 2025 state nuclear legislation

- As of December 1st, **279** bills have been introduced in 2025 with **73** enrolled into law.



# State nuclear feasibility studies and working groups



**31**

**feasibility studies covering a range of topics including policy, technical, and economic analyses**

- **20** studies have been completed
- **2** pending completion by end of 2025
- **8** pending completion by end of 2026 or later
- There are active working groups in ***Arizona, Hawaii, Idaho, Louisiana, Ohio, Oklahoma, Tennessee, and Virginia***
- There are active regulatory dockets in ***Arizona, Kentucky, and Oklahoma***

# 2025 state nuclear legislation trends



## Construction Work in Progress/Advanced Rate Recovery

- Indiana
- Arkansas
- North Carolina
- Missouri



## Tax Credit Incentives for Generation and Manufacturing

- Indiana
- Maryland
- Michigan
- Pennsylvania
- Texas
- Washington



## Direct Support for the Nuclear Industry and Nuclear Projects

- Texas
- Tennessee
- Utah
- Kentucky
- New Jersey
- Mississippi



# Idaho National Laboratory

*Battelle Energy Alliance manages INL for the U.S. Department of Energy's Office of Nuclear Energy. INL is the nation's center for nuclear energy research and development, and also performs research in each of DOE's strategic goal areas: energy, national security, science and the environment.*