

U.S. DEPARTMENT OF  
**ENERGY**

*Office of*  
**NUCLEAR ENERGY**

# **DOE Office of Nuclear Energy 2023 Outlook**

**Dr. Kathryn (Katy) Huff**

**Assistant Secretary for Nuclear Energy, Department of Energy**

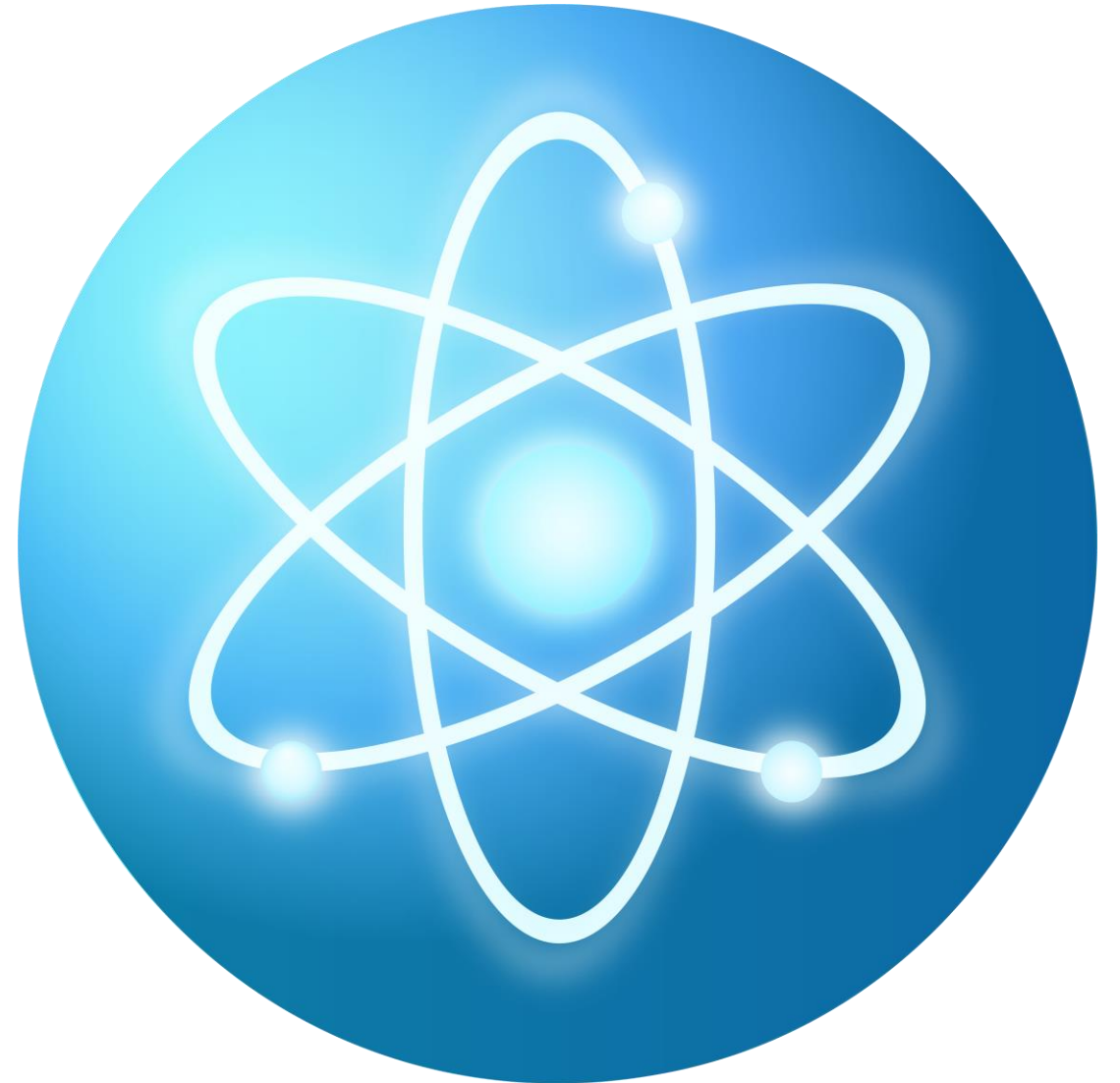
**April 19, 2023**

# Mission

To advance nuclear energy science and technology to meet U.S. energy, environmental, and economic needs

# Priorities

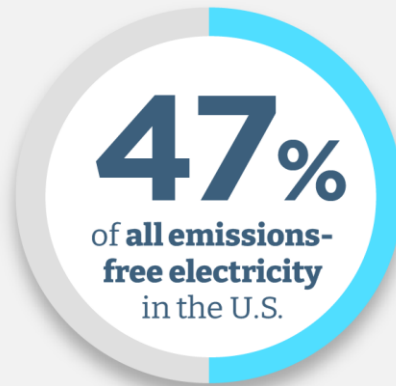
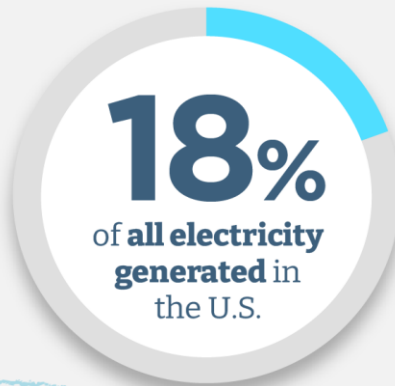
- Keep existing U.S. nuclear reactors operating.
- Deploy new nuclear reactors.
- Secure and sustain our nuclear fuel cycle.
- Expand international nuclear energy cooperation.



# Enable continued operation of existing U.S. nuclear reactors

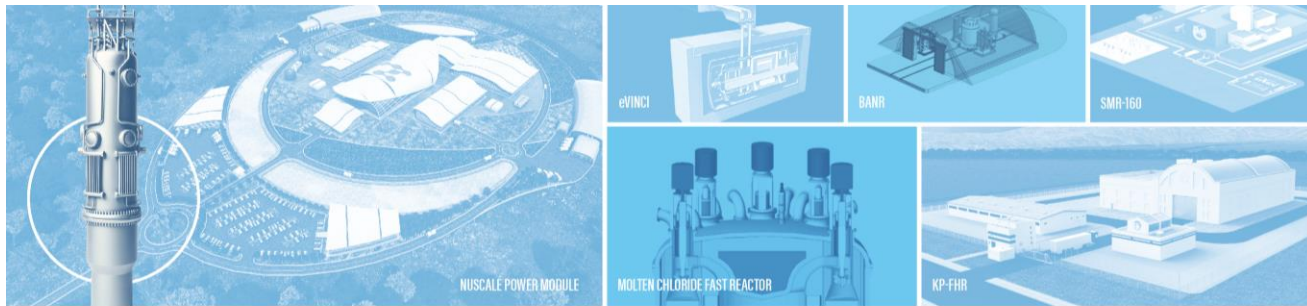
Nuclear power is **carbon-free energy.**

It's the **largest source of carbon-free electricity** in the United States!



- R&D programs enhance performance, extend lifetime, reduce operating costs, and develop advanced fuels.
- Integrated energy systems research and hydrogen production demonstrations expand applications and markets for nuclear energy.

# Enable deployment of advanced nuclear reactors



## ADVANCED NUCLEAR TECHNOLOGY

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- Essential to tackling climate crisis, supplying clean energy, and decarbonizing the economy
- Demonstrating reactors with advances in sustainability, safety and reliability, resource utilization, and economics
- Developing small modular reactors to offer siting flexibility, scalability, and energy uses beyond electricity
- Developing microreactors for off-grid communities, remote industrial locations, and disaster relief missions

# Coal to Nuclear Transition



A recent [@ENERGY](#) report finds 80% of coal power plant sites could be converted to nuclear power plants—more than doubling U.S. nuclear capacity to more than 250 gigawatts.



- Nuclear reactors are especially suited to leverage grid, workforce, and other assets at retiring or retired coal plant sites.
- Repurposing unabated fossil plants could deliver place-based solutions and ensure equitable energy transition.
- DOE analysis finds hundreds of coal power plant sites across the country could be converted to nuclear power plant sites.
- Study shows energy communities could benefit from adding 650 permanent jobs, additional economic activity of \$275 million, and 86% reduction in greenhouse gas emissions.
- Leveraging existing infrastructure and highly skilled workforce can reduce system costs.

# Pathways to Commercial Liftoff

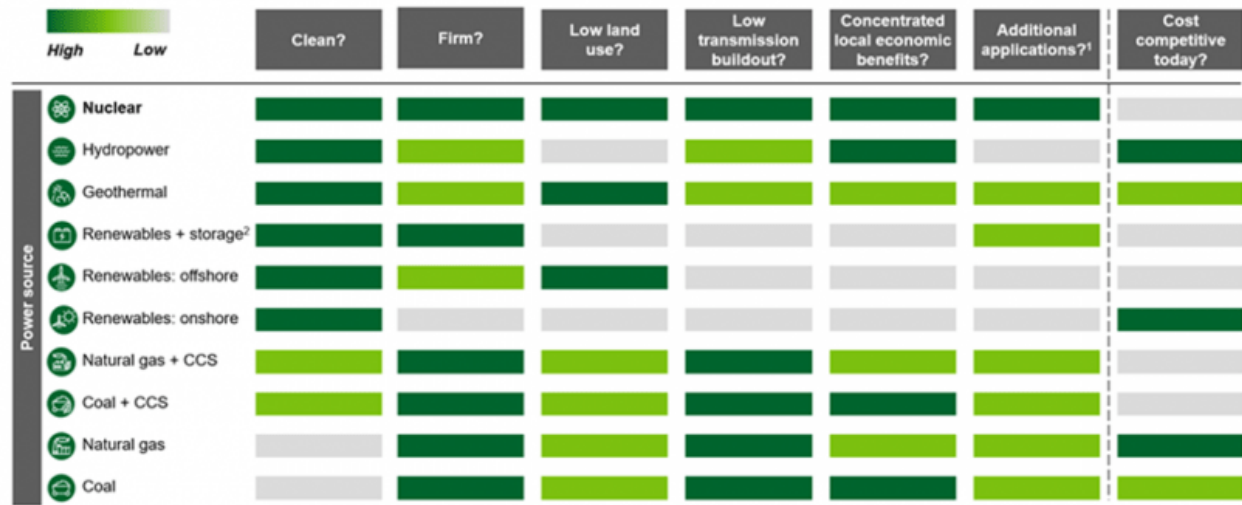


Figure: Select elements of nuclear energy's value proposition as compared to other power sources.

1. Additional applications include clean hydrogen generation, industrial process heat, desalination of water, district heating, off-grid power, and craft propulsion and power  
 2. Renewables + storage includes renewables coupled with long duration energy storage or renewables coupled with hydrogen storage

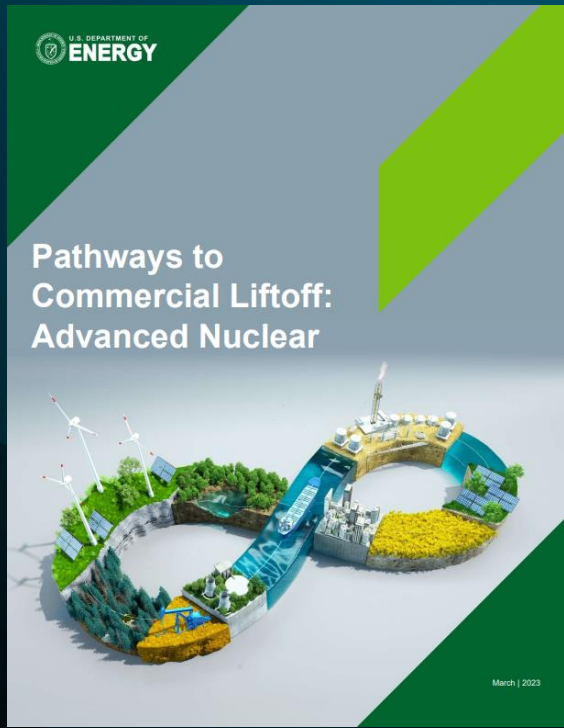
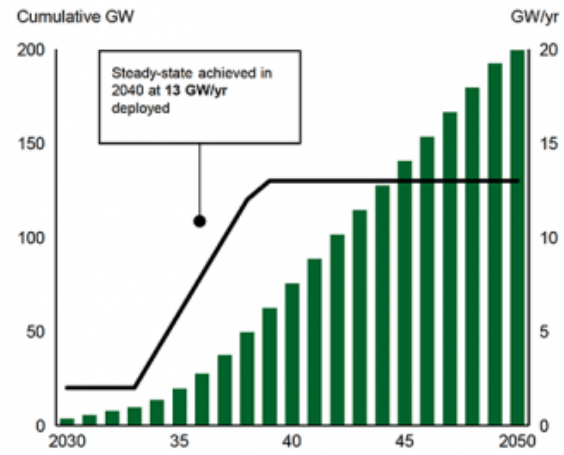
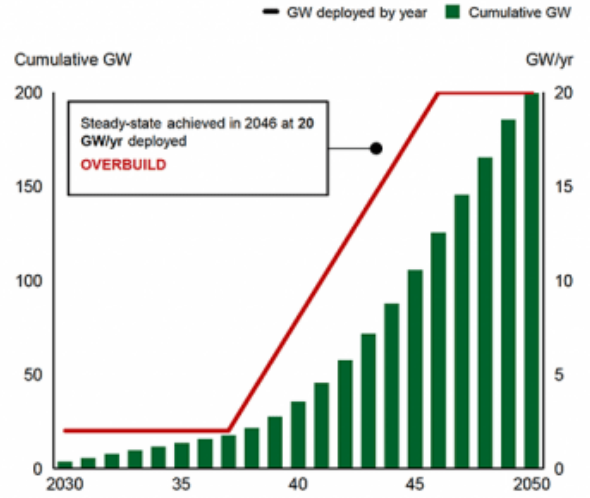


Figure: New nuclear build-out scenarios and implications for industrial base capacity requirements.

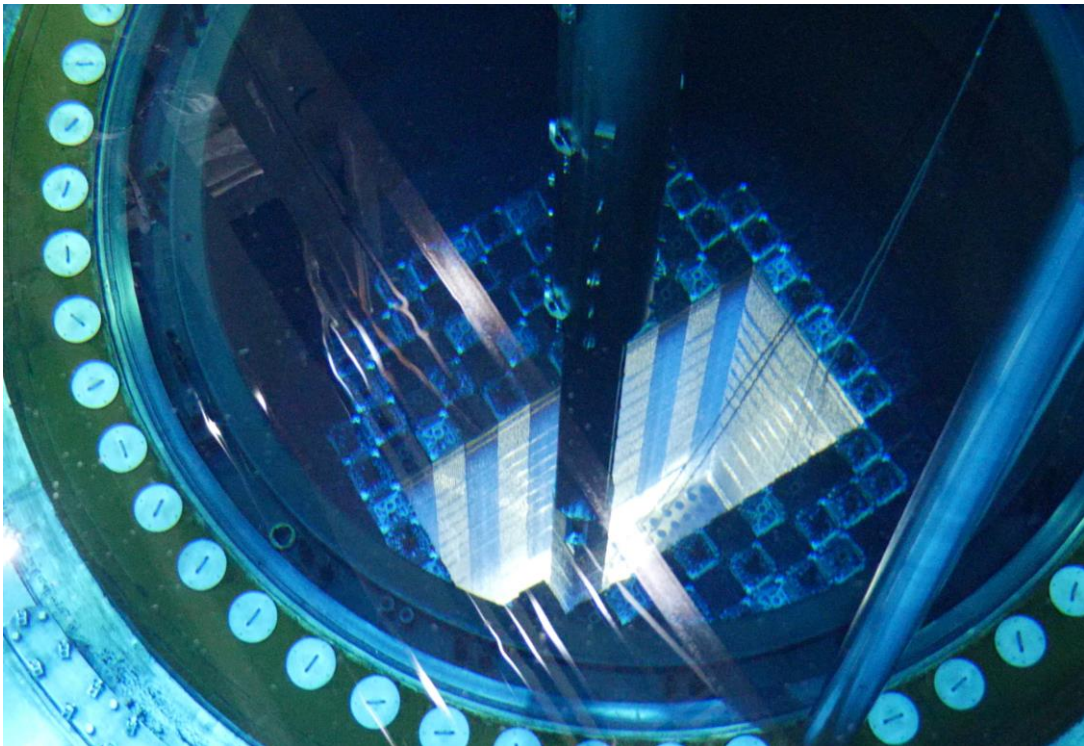
New nuclear deployment starting in 2030  
 Annual deployment (GW/yr) built and Cumulative GW online



New nuclear deployment starting in 2035  
 Annual deployment (GW/yr) built and Cumulative GW online



# Secure and sustain the global nuclear fuel cycle



- Addressing gaps in the domestic nuclear fuel supply chain for existing and advanced nuclear reactors
- Encouraging expansion of domestic commercial capacity in conversion and enrichment services to assure the supply of low enriched uranium (LEU) and high-assay low-enriched uranium (HALEU)
- Developing strategy for the integrated waste management of spent nuclear fuel
- Developing a consent-based approach to siting interim storage facilities

# Consent-Based Siting

While spent nuclear fuel is stored safely at over 70 U.S. sites, those communities never agreed to host that material in the long term.

DOE is committed to a consent-based process for siting one or more consolidated interim spent nuclear fuel storage facilities.

- Prioritizes people and communities
- Seeks willing and informed consent
- Flexible, adaptive, and collaborative process
- Responsive to community concerns
- Centers equity and environmental justice
- Informed by public feedback



[energy.gov/consentbasedsiting](https://energy.gov/consentbasedsiting)



# Expand International Nuclear Energy Cooperation



- Support Front-End Engineering Design studies for U.S. nuclear builds in foreign markets.
- Support nuclear safety in Armenia and Ukraine, including emergency support.
- Deploy Clean Energy Training Centers to inform small and emerging nuclear states of U.S. nuclear technology within clean energy systems.
- Increase U.S. technical presence through bilateral nuclear energy cooperation particularly in Central and Eastern Europe, the Baltic States, Southeast Asia, and the Americas including workforce capacity building, academic and professional training, joint studies, and regional technical events.
- Leverage U.S. sponsorship of subject matter experts in international organizations to advance U.S. nuclear equities.



**Thank You!**

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