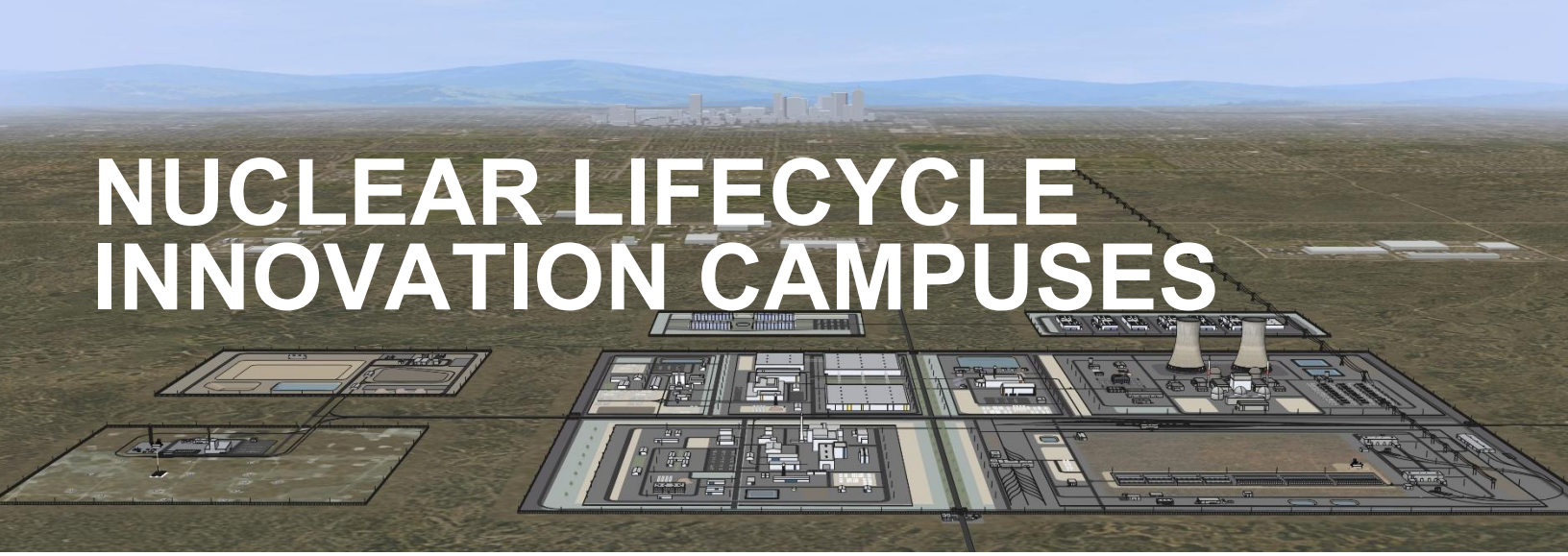


NUCLEAR LIFECYCLE INNOVATION CAMPUSES

Reestablishing global leadership in nuclear energy

The United States initiated a new effort to modernize the nation's full nuclear fuel cycle by co-locating functions such as fuel fabrication, enrichment, reprocessing used nuclear fuel, and disposition of waste. Nuclear Lifecycle Innovation Campuses (Campuses) will be established through voluntary federal-state partnerships designed to advance manufacturing and regional economic growth, enhance national energy security, and build a coherent end-to-end nuclear strategy for the country.

The United States is undertaking an initiative to reestablish global leadership in nuclear energy. Work is guided by four executive orders signed on May 23, 2025, that underscore the urgent national imperative to secure economic resilience, energy independence, national defense, and technological leadership.

A conceptual rendering of facilities part of a Nuclear Lifecycle Innovation Campus.

Scan for more information from the Department of Energy.

Economic investments for jobs and growth

As states and host communities partner with the Department of Energy (DOE) to explore and develop Campus concepts, these efforts could generate billions of dollars in investment and economic activity over the coming decades. Host states and communities stand to benefit from regional economic growth, infrastructure improvements, and a prominent role in the expanding nuclear energy sector.

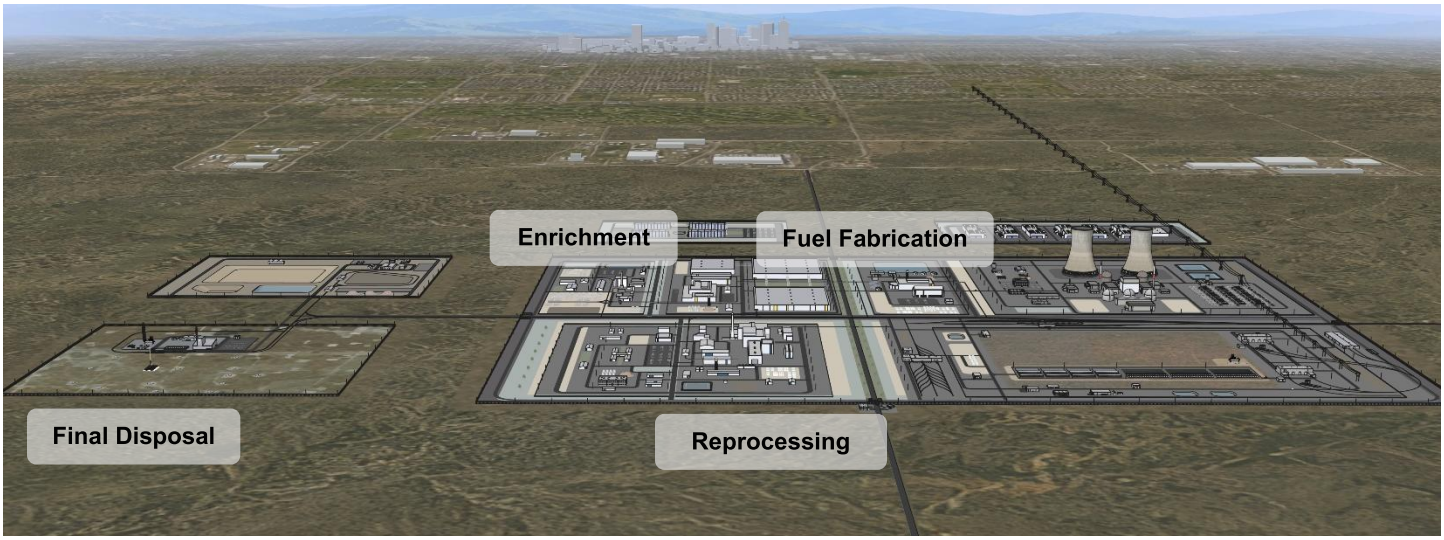
A Campus can serve as a powerful economic engine, driving billions of dollars in capital investment and annual tax revenue. In addition to creating more than 22,000 permanent jobs, the Campus is expected to support two to three indirect jobs for every direct position created, resulting in billions of dollars in annual wages and broader economic growth across the state.

States and host communities may choose to build additional energy-generating facilities or other large projects that utilize the Campus for increased economic development.

A state and local answer to a national need

A Campus is also a response to a national challenge with used nuclear fuel that has faced our country for decades. Strategic and national benefits to hosting a Campus could position the state as a critical player in both national and global arenas:

- National Security Contributions
- Global Leadership in Nuclear Innovation
- Technological Innovation Center



National Campus Capabilities - Guided by State and Local Input

The host state and community will determine which components of the fuel cycle they would like to have sited at the Campus through private sector partnerships. By federal law, DOE will own all components of the site relating to the storage of used nuclear fuel and the disposal of High-Level Waste (marked as “Final Disposal” in the graphic above). The Campus and may include facilities that encompass the following components of the nuclear fuel cycle:

Advanced fuel fabrication

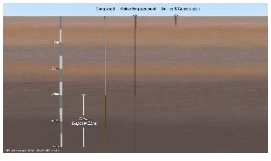
Enriched uranium is fabricated into small ceramic pellets, which are stacked inside metallic fuel rods, and then assembled into a grid called a fuel assembly that can be loaded into the reactors in our current nuclear fleet to produce power. Some advanced reactors utilize other fuel forms that could be manufactured at the campus as well.

Conversion & enrichment

Mined uranium is processed into yellowcake and then converted into a chemical that can be enriched in fast-spinning centrifuges and eventually fabricated into nuclear fuel. Enrichment is a necessary process that makes nuclear fuel able to produce energy in the reactor. Conventional light water reactors in the U.S. require fuel that is enriched to between 3 to 5 percent Uranium-235.

Recycling & isotope production

Reprocessing or recycling used nuclear fuel[1] involves separating it into its constituent parts through chemical or electrochemical processes. Materials that can be reused are refabricated into fuel, after additional enrichment, and put back into a reactor to produce power. Additional valuable materials such as rare earth metals and medical isotopes may be extracted from the used nuclear fuel during the reprocessing and recycling.



Final disposal

After all usable materials are separated from used nuclear fuel, any remaining residual material will be placed in robust and specially designed containers for disposal deep underground. The U.S. is considering borehole disposal and or a deep geologic mined facility. Either method will geologically isolate used nuclear fuel or high-level radioactive waste from people and the environment for long-term disposal.

1 The term “used nuclear fuel” is intended to be synonymous with the term “spent nuclear fuel” as used and defined in the Nuclear Waste Policy Act of 1982, as amended, and the Standard Contract for the Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste (10 CFR Part 961).