NUCLEAR FUEL

92
U
Uranium
238.0289

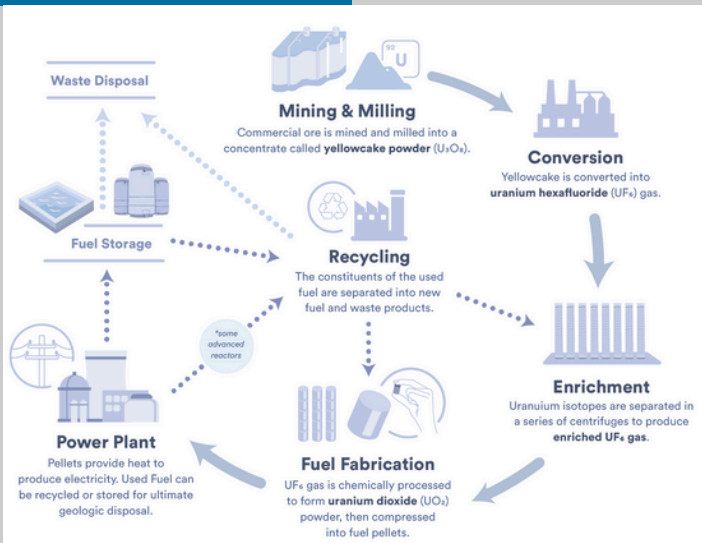
Uranium

Uranium is a naturally occurring element commonly used as fuel in commercial nuclear reactors. To prepare uranium for use in nuclear reactors, it must undergo four key steps: mining and milling, conversion, enrichment and fuel fabrication. Current U.S. nuclear reactors run on uranium fuel enriched up to 5 percent with uranium-235—the main fissile isotope that produces energy.

Uranium Mining in Utah

Utah's unique geology means it has substantial uranium deposits in the permeable sandstones found in the Colorado Plateau's Morrison and Chinle Formations. The majority of Utah's historic uranium production came from the southeastern part of the state. Today, Utah hosts the only fully licensed and operating uranium ore mill in the U.S., the White Mesa Mill in San Juan County.

Fuel is fabricated into small ceramic pellets that are stacked vertically to form a fuel rod. The fuel rods are bundled into groups of closed metal tubes, called fuel assemblies, and placed inside a reactor core.



The nuclear fuel cycle. Graphic courtesy of U.S. Department of Energy.

Nuclear fuel spends about 5 years in a reactor before it's removed and replaced with new fuel. Nuclear fuel is a solid when it goes into a reactor and a solid when it comes out.

Energy Impact

One pellet of low-enriched uranium (about the size of a thumbnail) can generate roughly the same amount of electricity as one ton of coal, 120 gallons of oil or 17,000 ft^3 of natural gas.

Advanced Reactor Fuel

Many advanced reactors will use slightly higher enriched fuel (between 5 and 19.75%) called high-assay, low-enriched uranium, or HALEU. HALEU enables smaller reactor designs, longer operating cycles, increased efficiency and reduced waste.

UTAH OFFICE OF ENERGY DEVELOPMENT