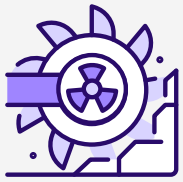
The nuclear value chain

Mining to fuel fabrication



Mining and milling

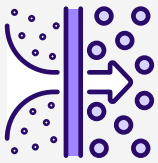
Uranium is extracted from mines or recovered by circulating solutions through underground deposits. Processing concentrates it into yellowcake, the raw material that begins the nuclear fuel supply chain.

Cameco (CCJ), Uranium Energy (UEC) and Energy Fuels (UUUU).

Conversion

Conversion plants chemically process yellowcake into forms needed for reactor fuel. For most commercial reactors, uranium is converted into uranium hexafluoride, a compound that becomes a gas when heated for enrichment.

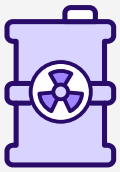
Solstice Advanced Materials (SOLS) and Cameco (CCJ).



Enrichment

Enrichment increases the proportion of uranium-235, the isotope of uranium that sustains the nuclear chain reaction. Most commercial reactors use low-enriched uranium, while some advanced designs require higher enrichment levels.

Centrus Energy (LEU) and Silex Systems (ASX: SLX).

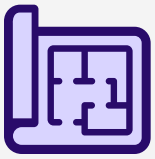


Fuel fabrication

Fabricators turn processed uranium into finished fuel tailored to a reactor's design. Conventional fuel typically consists of ceramic pellets sealed inside metal tubes, while some advanced reactors use specially coated fuel particles.

Cameco (CCJ), GE Vernova (GEV), and Standard Nuclear (STDN).

Producing power



Engineering and design

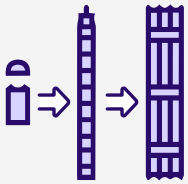
Engineers develop reactor designs, safety systems and the technical plans needed for licensing and construction. Their work also supports upgrades that help existing plants operate safely and extend their useful lives.

GE Vernova (GEV) and Cameco (CCJ).

Construction and services

Specialist firms build nuclear facilities and manufacture equipment to support operations throughout a plant's life. Their work includes maintenance, major refurbishments and decommissioning, connecting this stage to both new projects and existing infrastructure.

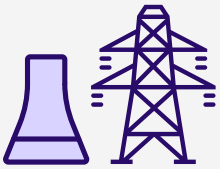
Fluor (FLR), Curtiss-Wright (CW), and Flowserve (FLS).



Advanced reactors

Developers are creating next-generation reactors, including small modular reactors and microreactors. Applications include remote communities, industrial heat, and outer space.

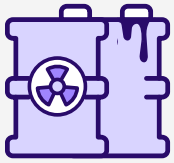
X-energy (XE), Oklo (OKLO), and NANO Nuclear Energy (NNE).



Utilities

Utilities and power producers own and operate nuclear plants, using heat from nuclear fission to generate electricity for customers. They manage refueling, maintenance and plant performance to provide reliable power over decades of operation.

Constellation Energy (CEG), Vistra (VST), and Talen Energy (TLN).



Waste and storage

Specialists treat, package and manage radioactive waste from nuclear operations and plant cleanup for storage or disposal. Used reactor fuel requires cooling and shielding, typically in pools followed by secure dry storage while awaiting permanent disposal.

Perma-Fix Environmental Services (PESI) and Amentum (AMTM).