UTAH OFFICE OF ENERGY DEVELOPMENT

Nuclear Energy Risks and Risk Mitigation

Nuclear energy offers reliable, clean power but can pose risks such as radioactive waste, accidents, proliferation and high costs. Advanced safety design, fuel-recycling, secure waste handling, strict oversight and streamlined regulations can ensure that nuclear energy remains safe and effective.

RISK

MITIGATION

Radioactive Waste

The creation of radioactive waste that occurs in the generation of power from nuclear energy, such as uranium mill tailings and spent reactor fuel can remain hazardous to human health for thousands of years.

Radioactive waste from nuclear power is safely stored, treated and immobilized with long-term disposal in deep underground repositories. Spent fuel recovery mitigates nuclear waste by extracting and recycling usable materials, significantly reducing the volume, toxicity and storage duration of high-level waste. Ongoing monitoring and stringent regulations ensure environmental and public safety.

Reactor Emergencies

An uncontrolled reactor reaction can release radioactive materials, threatening public health and the environment, as contamination can spread widely and persist for years.

Nuclear plants use multiple safety layers, along with strict oversight and regular checks. New Gen III and III+ reactors add advanced, passive, fail-safe features that work automatically, even without power or operator action, further reducing the chance and impact of radioactive leaks.

Proliferation

Nuclear technology and materials can potentially be diverted for weapons use, raising concerns about the spread of nuclear weapons, or weapons-making technology.

Safeguards and protocols make nuclear proliferation highly unlikely. The International Atomic Energy Agency enforces strict inspections and material tracking, while export controls and international cooperation further reduce risks. Despite the growth of nuclear energy, there has never been a nuclear attack or use of stolen nuclear material against the public.

Cost and Time Challenges

Building nuclear power plants requires significant upfront investment and long construction periods.

Developers are using modular construction, better project management and early risk assessment. Legislation can streamline permitting and regulatory reviews, cutting delays while ensuring safety. Workforce learning will prevent delays and speed timelines.