



# Center for International Trade and Security

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**UNIVERSITY OF GEORGIA**

SEPTEMBER 2023

## The U.S. Should Look Abroad for Nuclear Waste Solutions

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Russia's war in Ukraine has led to seismic shifts in how the world thinks about energy demand. Commercial nuclear energy, in particular, is experiencing something of a renaissance. Many countries are halting their plans to decommission existing reactors, exploring the construction of new reactors, and investing in new reactor technologies. As a result, the International Atomic Energy Agency (IAEA) estimates that global nuclear energy-generating capacity could more than double by 2050.

Ensuring the safe expansion of nuclear energy around the world, in turn, requires a renewed focus on what to do with the waste. The so-called "back end" of the nuclear fuel cycle has been one of the most important obstacles preventing the wider adoption of nuclear energy, because of the public stigma attached to it.

The United States has mostly dealt with nuclear waste in an ad-hoc manner, but it can no longer

afford to do so. A permanent storage site, selected through a consent-based process, is critical to ensure the nation's energy and climate security.

Thankfully, some of our allies – including France, Sweden, and Finland – are demonstrating how to tackle the waste challenge while also giving local populations a say.

### **THE DISPOSAL OF SPENT NUCLEAR FUEL AND HIGH-LEVEL WASTE IS A GROWING, NOT RECEDING, CHALLENGE.**

To date, U.S. commercial reactors have generated approximately 90,000 metric tons of nuclear waste. Each year, the U.S. generates an additional 2,000 metric tons of solid spent fuel which is temporarily stored at over 70 reactor sites across the country. The U.S. cannot fully capitalize on the potential of nuclear energy until a viable disposal solution exists.



A permanent solution once existed, at least in theory. In the Nuclear Waste Policy Act of 1982, the U.S. government famously committed to permanent disposal at the geologic repository at Yucca Mountain, Nevada. After years of delays and pushbacks, the project was indefinitely postponed in 2010 due to ongoing public opposition to the project. Local communities, Tribal Nations, environmental groups, and politicians argued that the government never received consent to site the project at Yucca Mountain.

The NWPA had stipulated Yucca Mountain as the sole site for permanent disposal, and so when efforts to secure the license were abandoned, the nation's spent nuclear fuel was left in limbo. Commercial nuclear waste, in turn, has been stranded at reactor sites across the country. Typically, the reactor operator will store spent fuel in above-ground dry cask storage containers. These dry cask inventories continue to grow, despite the U.S. government's commitment in the NWPA to take ownership of the spent fuel. The U.S. Department of Energy (DOE)

has paid out roughly \$9 billion to reactor owners due to the inability to fulfill this promise and continues to pay about \$500 million annually. Lacking a permanent storage site, the DOE is expected to pay another \$28 to \$50 billion total before a solution is found.

### **ADDRESSING THE FINANCIAL AND LEGAL LIABILITIES OF SPENT FUEL AND HIGH-LEVEL WASTE REQUIRES A CONSENT-BASED STORAGE SOLUTION.**

A solution can only be reached with the consent of the local population that ultimately hosts the site, lest we repeat the mistakes of Yucca Mountain. A consent-based siting approach is therefore the key to ensuring that interim and permanent storage moves forward.

Other countries are proving that this approach can work. Finland provides the most compelling success story of consent-based siting with their construction of the Onkalo permanent nuclear waste repository.

Set to open in 2024, the site is comprised of 31 tunnels at 1,300 feet underground that will hold an estimated 6,500 tons of nuclear waste. The siting and construction of the Onkalo site is greatly attributed to community engagement with the people located on the island of Olkiluoto who have received education on nuclear power plants.

Sweden has also used a consent-based siting approach in the approval of a final repository in the bedrock at Forsmark that will hold 12,000 tons of spent fuel upon completion. The government approval of the Forsmark site was made possible through multilateral engagement of researchers, environmental organizations, local municipalities, and the general public throughout the process.

Consent-based siting is most effective when it prioritizes the goals of energy equity and environmental justice. A comprehensive solution is only

achievable when the perspectives and concerns of all relevant stakeholders are fully considered and incorporated into the decision-making process. A recent draft bill, introduced by Senator Joe Manchin in the Senate Committee on Energy and Natural Resources, is a promising development. It would require, among other things, public consent in the siting of nuclear waste storage facilities.

Nuclear waste management is a formidable challenge, one that is only expected to grow as the world turns increasingly to nuclear power. Advanced reactor designs will mitigate some of our future waste volumes, but not all of them. Consent-based siting of a long-term storage facility will therefore make the U.S. safer and more secure, and pave the way for the country to meet its carbon reduction goals. We only need to look abroad for evidence that it can work.

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