



# Uranium mining practices impacts on human health and the environment

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## Introduction

Uranium is a heavy metal found widely in Earth's crust and is the primary fuel source for nuclear energy worldwide. Nuclear energy provides a major source of low-carbon electricity, reducing dependence on fossil fuels. However, uranium is both chemically toxic and radioactive, causing health risks such as kidney damage, DNA damage, cancer, and reproductive effects. As uranium breaks down in rocks, soil, and groundwater, it produces radon gas, a major cause of lung cancer and a significant concern for uranium miners (United States Environmental Protection Agency, 2025; Dewar et al., 2013).

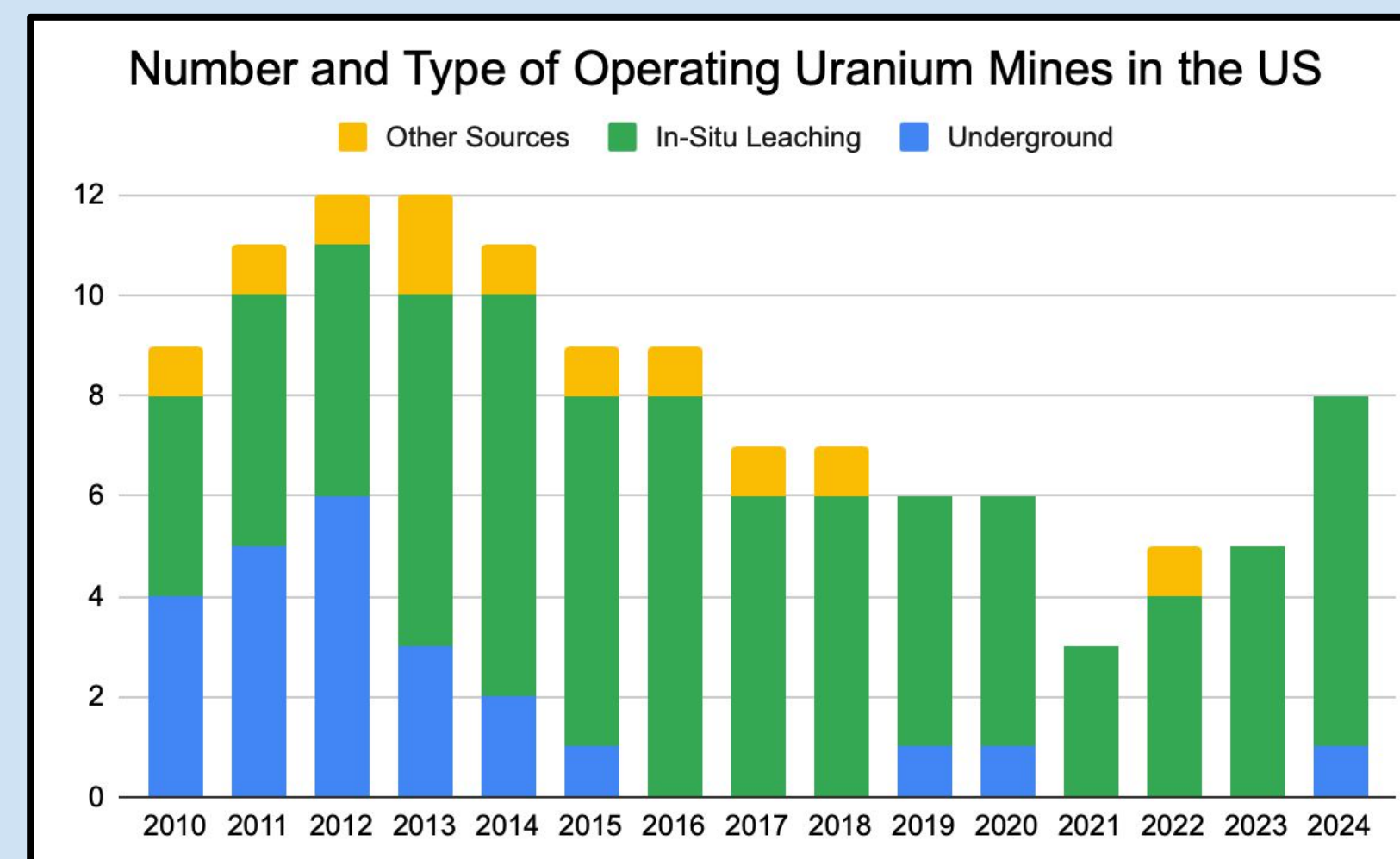
Uranium mining also creates environmental risks, including increased background radiation and contamination of soil and water supplies, threatening crops and drinking water (Dewar et al., 2013). In the United States, mining is concentrated in the Southwest—particularly Wyoming, New Mexico, Utah, and Texas—and is commonly conducted through In-Situ Leaching (ISL), which accounted for 56% of global uranium production in 2022 (World Nuclear Association, 2026).

Despite regulated extraction methods, uranium mining continues to pose serious environmental and health concerns. Studies in the Navajo Nation, home to hundreds of abandoned uranium mine sites, found elevated levels of uranium and arsenic in groundwater (Jones et al., 2020). Long-term research also shows increased rates of lung cancer and other diseases among miners and nearby communities, many of whom are Indigenous (Brugge & Goble, 2002). This project visualizes the dominance of ISL mining in the United States, the rise of nuclear energy that mass uranium mining has supported, and the associated health risks for uranium miners.

## Methods

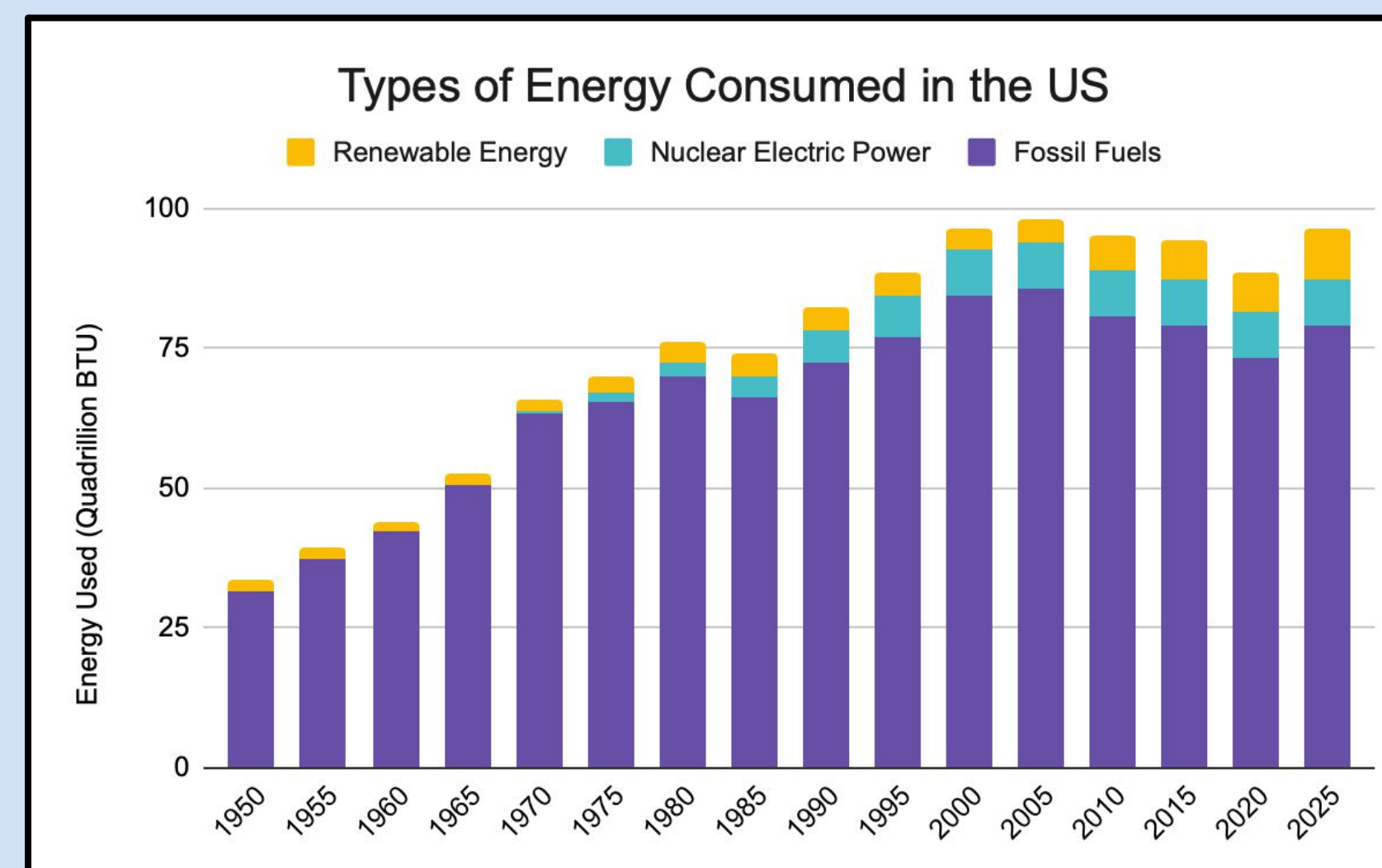
- Our data for our figures comes from two main sources: United States Energy Information Administration and the National Library of Medicine.
- We also gathered information on long term environmental and health effects from peer reviewed studies.
- After transferring the data sets, we used google sheets to produce Figures 1, 2, and 3.

**Finding 1:** The number of uranium mines in the US decreased from 2012-2021, likely due to the realization of the dangers of nuclear energy after the 2011 Fukushima accident. The numbers of mines have begun to increase from 2021 as demand for nuclear energy has increased and the US government has incentivized domestic fuel production. The most common mining type has consistently been ISL because of its lesser environmental impacts and recently its faster restart time.



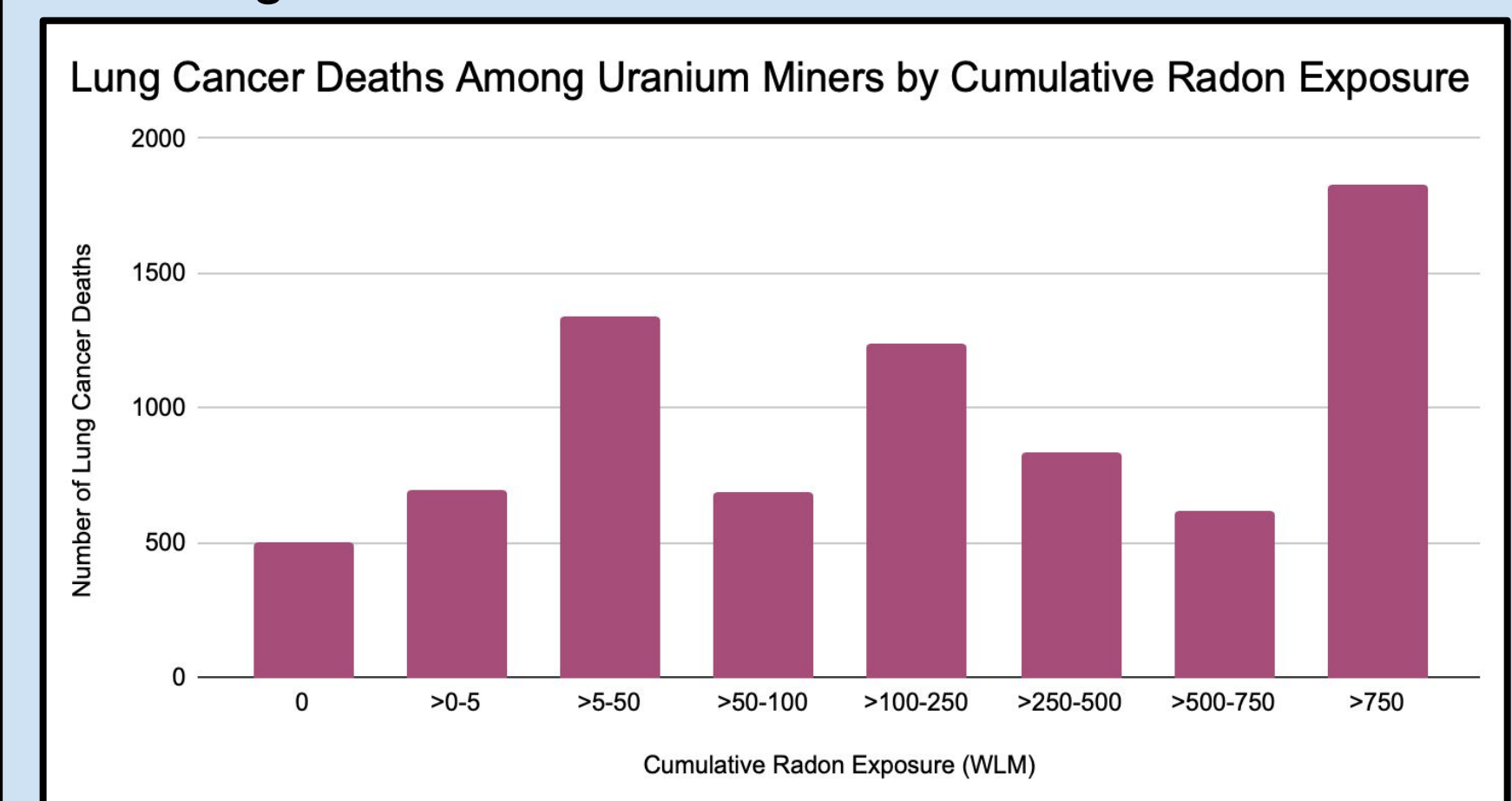
**Figure 1.** Total number of Uranium mines in the United States from 2010-2024. Adapted from *2024 Domestic Uranium Production Report*, by U.S. Energy Information Administration, 2025.

**Finding 2:** The amount of energy consumed in the US has increased from 1950 to 2025 with the primary energy source being fossil fuels. Nuclear energy first started being used in 1965, but only made a noticeable impact beginning in 1975. Nuclear energy is generally viewed as clean energy because it does not emit greenhouse gases like carbon dioxide, which is a likely reason for the uptick in consumption matching that of renewable energy over recent years.



**Figure 2.** Type and amount of energy consumed in the United States in Quadrillion British thermal units from 1950-2025. Adapted from *April 2026 Monthly Energy Review*, by U.S. Energy Information Administration, 2025.

**Finding 3:** In a pooled analysis of male uranium miners hired in 1960 or later in Canada, Czech Republic, France, Germany, and the United States, we found lung cancer deaths vary across the different levels of cumulative radon exposure. The highest exposure group (>750 WLM) had the the greatest number of deaths (1,830) across all exposure levels. It is unclear why deaths do not increase consistently with higher exposure, however this study did not account for other factors such as smoking which could have influenced the data.



**Figure 3.** Number of lung cancer deaths by cumulative radon exposure in working level month (WLM) after 1960. Adapted from "Lung cancer and radon: Pooled analysis of uranium miners hired in 1960 or later," by D. B. Richardson et al., 2022.

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