Nuclear Energy Reflection

1. From definition, energy released in nuclear fission is harnessed to heat water and to drive a turbine. It is considered a non-renewable energy and said to be 100% carbon neutral in the energy production process itself. It is usually fueled by uranium in that energy is harnessed when uranium atoms undergo a process called **fission**. From this process, they release energy, heat up water and drive a turbine. Do you consider this process a viable fuel option? Why or why not. (Feel free to use outside resources for your argument and make sure to cite your resources).

I consider this to be a viable fuel option for the time being. Because our main concern at this point in time in regard to energy production is greenhouse gas emissions, the use of uranium in nuclear fission is an excellent choice for sustainable energy. The major concern for this option of energy production is that it is still reliant on a non-renewable resource that must undergo a specific refining process for use, not unlike crude oil. Therefore, uranium is a viable fuel option for the period of transition between fossil fuels and renewable energy sources. Until renewable energy can be made more reliable and batteries are invented for energy storage, nuclear power is our best option.

1. Do you consider any negative effects of the mining of “**Thorium**”? How would you compare this to the mining of coal?

Mining thorium can have negative impacts, both on the environment and the humans participating in this activity. Thorium is often found in rare earth elements including some minerals, thus it is usually a byproduct of other mining activities. Thorium is a radioactive substance and can result in exposing the environment to radioactivity if not handled properly. Additionally, the waste from processing thorium into uranium-233 for use in a reactor also creates radioactive waste that needs careful disposal.[[1]](#footnote-1) On the other hand, coal burning has been proven to expose the environment (and those around coal burning plants) to radiation levels one hundred times higher than those of thorium mining or milling. This is because thorium and uranium can be found in trace amounts in coal, but the act of burning that coal concentrates them and spits them into the atmosphere.[[2]](#footnote-2)

Finally, it is not clear whether humans working in thorium mining or milling are at a higher risk of developing cancer. Organizations differ on whether they consider these activities carcingenic. One study previously concluded that workers in thorium milling were in fact at higher risk for some cancers, but this was later retracted and attributed to their smoking habits rather than their occupation. It is clear that ingestion of high amounts of thorium can cause increased risk of cancers. However, whether working on mining and milling leads to these higher levels of ingestion is unclear.[[3]](#footnote-3)

1. Do you have any issues pertaining to the safety of Nuclear Power plants? Do you consider the happenings at **Chernobyl** and **Fukushima** as any warning indicators? Please explain.

After watching Michael Shellenberger’s TEDx Talk, “Why I Changed My Mind About Nuclear Power,” he changed my mind about nuclear power. There are many documentaries on nuclear power disasters like Chernobyl and Three Mile Island that would scare anyone. After seeing the data on Chernobyl citizens decades later, I feel lied to. Of course, these accidents were terrifying for those who experienced them. However, it seems that our fears about the repurcussions of radioactivity leaking into the atmosphere during a nuclear meltdown have been overblown for decades. Very few of those from Chernobyl experienced early deaths. Some have lived with cancer, which is daunting in its own right, but likely have not experienced major restrictions on their lives.

This is not to say that this risk should be accepted and some should bear the weight of possible suffering for the benefit of the many. In contrast, nuclear power plants have proven to be safer work environments that coal plants or even solar farms. Additionally, robust regulations and more advanced reactors, such as the Generation IV, can assure neighbors of nuclear power plants that accidents like Chernobyl and Fukushima will not happen again and any further incidents will be contained.

1. Compare or Contrast the two videos **"Nuclear Power as an alternative to Fossil Fuel (TEDx**)”and “**Why I changed my mind about nuclear power** (**TEDx**). Are both these TED X talks leading to the same or similar conclusions?

Both of these talks are leading to the same conclusion that nuclear power is our best alternative to fossil fuels when it comes to greenhouse gas emissions and reliable energy production.

1. What policy do you think should be implemented for countries that are deemed 'suspect' in terms of nuclear policy and control?

As Michael Shellenberger pointed out, restricting access to nuclear power plant technology does not limit access or ensure restriction from developing nuclear weapons. North Korea and South Korea were restricted and allowed access to nuclear power technology, respectively. Now, North Korea has nuclear weapons but no nuclear energy, and South Korea has nuclear energy but no weapons. Therefore, we should allow any country that wants to build nuclear reactors to do so as it is an invaluable tool for combatting global climate change.

1. Ault, T., Van Gosen, B. S., Krahn, S., & Croff, A. (2016). Natural thorium resources and recovery: Options and impacts. *Nuclear Technology*, *194*(2), 136–151. USGS Publications Warehouse. <https://doi.org/10.13182/NT15-83>. [↑](#footnote-ref-1)
2. Hvistendahl, M. (2007). Coal ash is more radioactive than nuclear waste. *Scientific American*. <https://www.scientificamerican.com/article/coal-ash-is-more-radioactive-than-nuclear-waste/>. [↑](#footnote-ref-2)
3. Agency for Toxic Substances and Disease Registry. ToxFAQs for Thorium. <https://wwwn.cdc.gov/TSP/ToxFAQs/ToxFAQsDetails.aspx?faqid=659&toxid=121>. [↑](#footnote-ref-3)