

Review of: "[Commentary] Fallacy of Abundant Cheap Nuclear Energy"

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Potential competing interests: No potential competing interests to declare.

The prompt for this review indicates I should be thorough, constructive, and kind. This writing struggles with accuracy, professionalism, and purpose.

I do appreciate beginning the narrative with a discussion on real vs. false fuels. False fuels are essentially just energy storage systems using chemical energy storage, with hydrogen being a prime and pointed out example.

Fusion Energy:

1. You have a closed quote, but there's no beginning of the quote. I assume it's just the last sentence, but I cannot be sure.
2. Your entire "analysis" is completely useless once you use the words "their so-called fusion." They have clearly fused different H atoms into He atoms, unless you think that 3.15 MJ of energy appeared due to a violation of the second law of thermodynamics?
3. You did not provide the energy requirements for the production of deuterium and tritium. So your claim is only that 1.1MJ is insufficient for an unannounced amount of H₂ and H₃ input.
4. Why mention fusion at all if the only statement in this section is essentially: "check back later"?

Fission Energy of Plutonium:

There are pretty much 0 reactors currently operating or planned to operate on Pu, which is not an abundantly occurring natural atom. So the production of Pu actually requires the production of U most of the time, which means that its discussion in the absence of the fact that breeder nuclear reactors generate plutonium while operating and generating electricity from uranium is very weak. A more useful discussion to have here would be to say: assuming plutonium is a byproduct of other operations or that you can down-blend weapons, what is the net energy of building your power plant that fissions plutonium that exists? There is quite a bit of it.

Fission Energy of Uranium:

I believe you're conflating the concepts of $E=mc^2$ with the fact that fission simply releases some but not all of the binding energy of nuclei. I encourage you to look up the "binding energy per nucleon" charts (available on Wikipedia! Like that Plutonium article that was cited) that clearly and explicitly show how fusion shifts up from H to He and fission moves you up the chart at a smaller slope from U towards Fe.

There is no need to capitalize "sun."

Natural uranium actually CAN be used as a fuel; however, the operation and design of such reactors is more complex than enriching the U-235 content to 5%. In those reactors, again pointing back to the very under-written plutonium section, typically the U-239 is "bred" into Pu-239 and fissioned in that manner. It's a pretty straightforward neutron capture followed by beta decay process. Fundamentals of Nuclear Science and Engineering should have some clarifying text about it.

Status of Uranium as fuel, real or false?

I'm curious as to why this minimal analysis completely contradicts the conclusions of Manfred Lenzen in this article: <https://doi.org/10.1016/j.enconman.2008.01.033>, which is a much more detailed and thorough review and readily shows that uranium-driven reactors generate 3.33x-10x the amount of power needed to build the reactors? Your analysis includes an extremely speculative statement: "it is likely that to extract extremely pure natural Uranium... coal is required ten times the weight of the ore". It's unclear how you even extrapolated to this number.

It is somewhat misleading and certainly unhelpful to the reader to mention a report and then, rather than cite the report, cite your previous work in which you cite a report. (The statement that France has "not much benefited in the energy sector from its nuclear fuel/nuclear electricity as the country professes." Which is an odd statement to so boldly state since France has recently announced an expansion of their nuclear fleet by as many as 14 reactors.

Sorry to copy myself, but: Your entire "analysis" is completely useless once you used the word "propaganda". Your work, with such little scientific rigor or completeness, could just as easily be called anti-nuclear propaganda.

Overall:

This commentary lacks appropriate analysis techniques, literature review, understanding of the topic, and could be written in much more scientific terms. There is insufficient background for non-experts in the field to refute anything because statements are made without much citation and frequently without much discussion.

A positive: I enjoyed the definition of "real fuel" vs. "false fuel."

Based on the author's background from the linked profile, it is unclear that the author has scientific authority to speak on this subject. Additionally, there is no context given as to why the author thinks this discussion needs to be held.