

IS THORIUM A VIABLE OPTION FOR THE FUTURE? Nuclear Town Hall DEBATE OF THE WEEK

You don't have to be involved in nuclear very long before you start hearing about thorium. It's the other naturally occurring radioactive element that exists in large supplies and can produce nuclear fission.

The story is that Eugene Wigner, Alvin Weinberg and other pioneers of the Manhattan Project era believed thorium offered a much better way to tapping nuclear energy. We went the uranium route instead because uranium was the more practical option for the immediate task of building a bomb.

Nevertheless, thorium is three-to-four times as abundant as uranium. It doesn't require isotope separation – a huge cost saving. When bombarded by neutrons, thorium doesn't fission but converts to uranium-233 — which does. With U-233, the production of transuranics is orders of magnitude lower. This obviates any proliferation issues. (U-233 can be used to make a conventional weapon but is consumed all along within the reactor.). Depending on the reactor, the spent fuel can be much easier to handle. India has large supplies and is developing a thorium-based nuclear cycle.

While it might be a potentially appealing package for the U.S. — and was actually pursued to some extent in the 1990s — there are significant hurdles. The U.S. is obviously fully committed to the uranium fuel-cycle — as is the balance of the world — for the Renaissance. We are heavily invested in the status quo, both to meet U.S. demands and to compete internationally.

Can or should a thorium fuel cycle play a side-by-side role in Renaissance Rev 1.0? Is there a plausible business case for the massive investment necessary? Or do public acceptance and first-of-a-kind licensing issues make it impractical? Are there other more appealing Generation IV options? In short, what's the best way to proceed — if any — with the Thorium option?